Silcon DP300E Series
480V 120–160kVA
Installation Guide

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7OH0006 US rev. 03

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

This guide contains important instructions for your Silcon DP300E UPS that should be followed during installation and maintenance of the UPS and batteries.

The installation and use of this product must comply with all national, federal, state, municipal or local codes that apply. If you need help, please call APC's toll free technical support at: 1-877-287-7835 (1-877-2UPS-TEK).

WARNING!

UPS units contain hazardous AC and DC voltages. A qualified electrician must install the UPS, AC line service, and external batteries according to national and local codes and must be familiar with batteries and battery installation.

Before installing, maintaining, or servicing the UPS, shut off the UPS and disconnect all sources of AC and DC power.

This UPS system has no built-in disconnecting devices for the external AC and DC input power sources. Disconnecting devices must be provided as external parts in connection with the installation!

The installer must provide each external disconnecting device for this UPS system with labels having the following wording:

"Isolate the Uninterruptible Power Supply (UPS) as instructed in this guide before working on the circuit".

Whenever AC and/or DC voltage is applied, there may be AC voltage at the UPS output; this is true because the UPS can supply output power from utility or from its batteries. To avoid equipment damage or personal injury, always assume that there may be voltage at the UPS output.

This system is equipped with an auto-start function. If activated the system may start without warning. Please refer to chapter 4: "Programming parameters" in User Guide to ensure de-activation.

TEST BEFORE TOUCHING!

To reduce the risk of fire or electric shock, install the UPS and external batteries in a temperature and humidity controlled indoor area, free of conductive contaminants.

UPS batteries are high current sources. Shorting battery terminals or DC terminal strips can cause severe arcing, equipment damage and injury. A short circuit can cause a battery to explode. Always wear protective clothing and eye protection and use insulated tools when working near batteries.

This unit contains components that are sensitive to electrostatic discharge (ESD). If you do not follow proper ESD procedures, you may cause severe damage to electronic components.

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1.0 Introduction

The information provided in this installation guide is of a general nature for a local authorized electrical installer. Please refer to local/national electrical codes for more information.

SPE Factory Warranty:
1 year on parts and on-site labor. Labor response time is best endeavour. Travel expenses are not included. An APC Start-Up Service must be performed/completed by an APC or APC authorized service personnel or this on-site factory warranty (on-site labor) will be void. Parts will only be covered upon right commissioning and installation.

⚠ WARNING!
The UPS and related equipment are very heavy. To prevent personal injury or equipment damage, please use extreme care when handling and transporting the UPS cabinet and related equipment.

WARNING!
Never lift or transport the system without front doors and without the internal front cover plate mounted and fastened with screws.

1.1 Required tools and equipment

This section lists all tools that could be required to install the UPS and related equipment. Whether all tools are used, depends on what UPS configuration you are using.

Tools needed for installation of Silcon DP3120E and Silcon DP3160E:

10 mm socket
13 mm socket–deep
17 mm socket
3/4” or 19 mm socket–deep
3/4” or 19 mm combo wrench
Small flat/regular screwdriver
#3 philips screwdriver
Compression lug crimp tool
Knock–out set (for conduit)

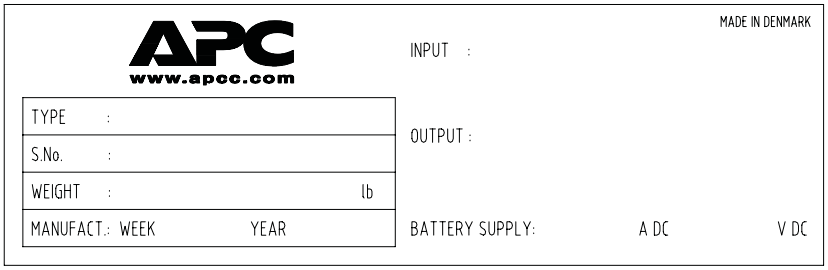
Supplies needed:

Compression lugs for power terminations
Cable to service bypass panel from system feeder (see wire sizing)
Cable to UPS input from service bypass panel (see wire sizing)
Cable to service bypass panel from UPS output (see wire sizing)
Cable from service bypass panel to customer distribution (see wire sizing)
Cable to UPS from external batteries/external MCCB (see wire sizing)
Control wire, solid core, to UPS from service bypass panel (see control wiring)
Control wire, solid core, to UPS from external batteries/external MCCB (see control wire)
Conduit necessary for above listed cabling (see wire size for requirements)

2.0 Unpacking

1. Unpack the system.
2. Check that the type sign placed inside on the front door corresponds to the ordered system, especially with respect to input / output voltages.
3. To simplify later identification of the installed system – please transfer the data from the type sign to the below blank copy.
4. Transport the system to the installation site by lifting underneath by means of a fork lift.

Copy of type sign (without battery):



2.1 Identifying equipment

This section is to help identifying and unpacking all received equipment and where to use it. Verify name plate on equipment to ensure that correct voltage/power ratings have been received.

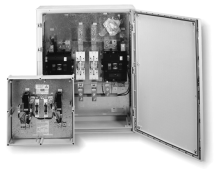
NOTE!
A lift truck will be required to lift some of the equipment off the pallet, unless special inside delivery was requested of the shipping company. Once off the pallet, all equipment can be moved, lifting from underneath using a fork lift, pallet jack, or special moving equipment.

NOTE!
If you have any questions regarding the equipment you receive please contact your local APC representative or call APC support (Listed in chapter 7).

Main UPS system.
This is the battery back-up system. Unconditioned power is fed to the UPS input and condition power is received from the UPS output.

Service bypass panel.
The service bypass panel is used for supplying the critical load from utility power while the UPS is shut-down for maintenance. All AC power connections should run through this panel.

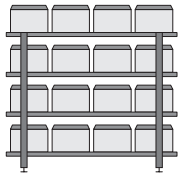
External MCCB/Fuse box.
This is used, if the external battery cabinet does not have an internal disconnection and an overcurrent protection, or if battery racks are used. If the batteries are located out of the UPS site, then external MCCB should be used near the UPS for proper disconnection of power.



Unpacking

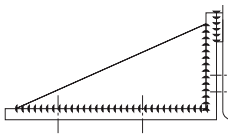
Battery rack or cubicle.
The rack or cubicle is used for external batteries, for storing the battery bank.

Battery cubicle

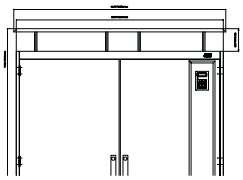

Battery rack

Isolation transformer.
The isolation transformer is used, when galvanic isolation is required from the source to the conditioned power. This transformer should also be used if the source is something other than a grounded Wye supply.

Seismic Anchoring.
Seismic anchoring is used for stabilization of the UPS, when needed for seismic areas.



NEMA 12 cover.
This is used for locations where there is a potential of liquid discharge or leakage above the UPS system.



Remote display.
The remote display is used for remote monitoring of the UPS.

3.0 Placing

WARNING!
Do not stand on or place any object on any UPS cabinet or UPS cubicle due to personal and product safety.

3.1 Requirements on the Installation Site

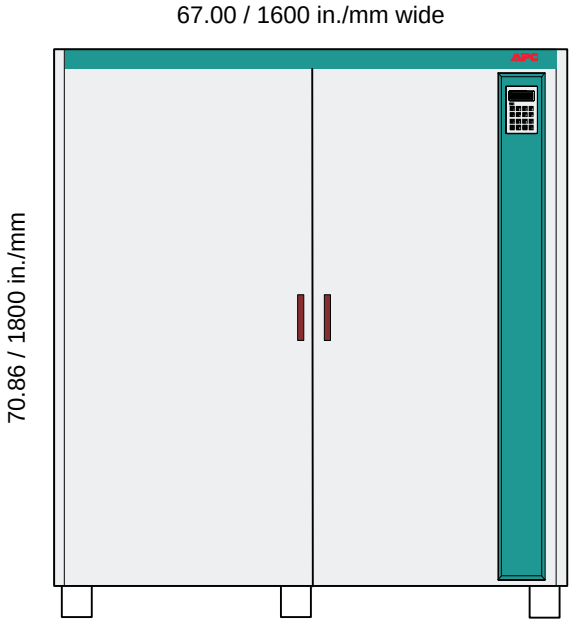
The system is designed with parts accessible from front or top and cable entries from top or bottom.
The system can be placed close to walls, only free space for front door opening has to be ensured.
Sufficient cooling and service clearance must be ensured by a free space of min. 3 feet above and in front of the system.
Avoid placing the system in direct sunlight.

3.2 Dimensions and Weights

3.2.1 Dimensions and Weights Silcon DP3120E–DP3160E

Type	Height inch/mm	Width inch/mm	Depth inch/mm	Weight lbs/kg
DP3120E/480V	70.86/1800	67.00/1600	31.50/800	2643/1200
DP3160E/480V	70.86/1800	67.00/1600	31.50/800	2643/1200

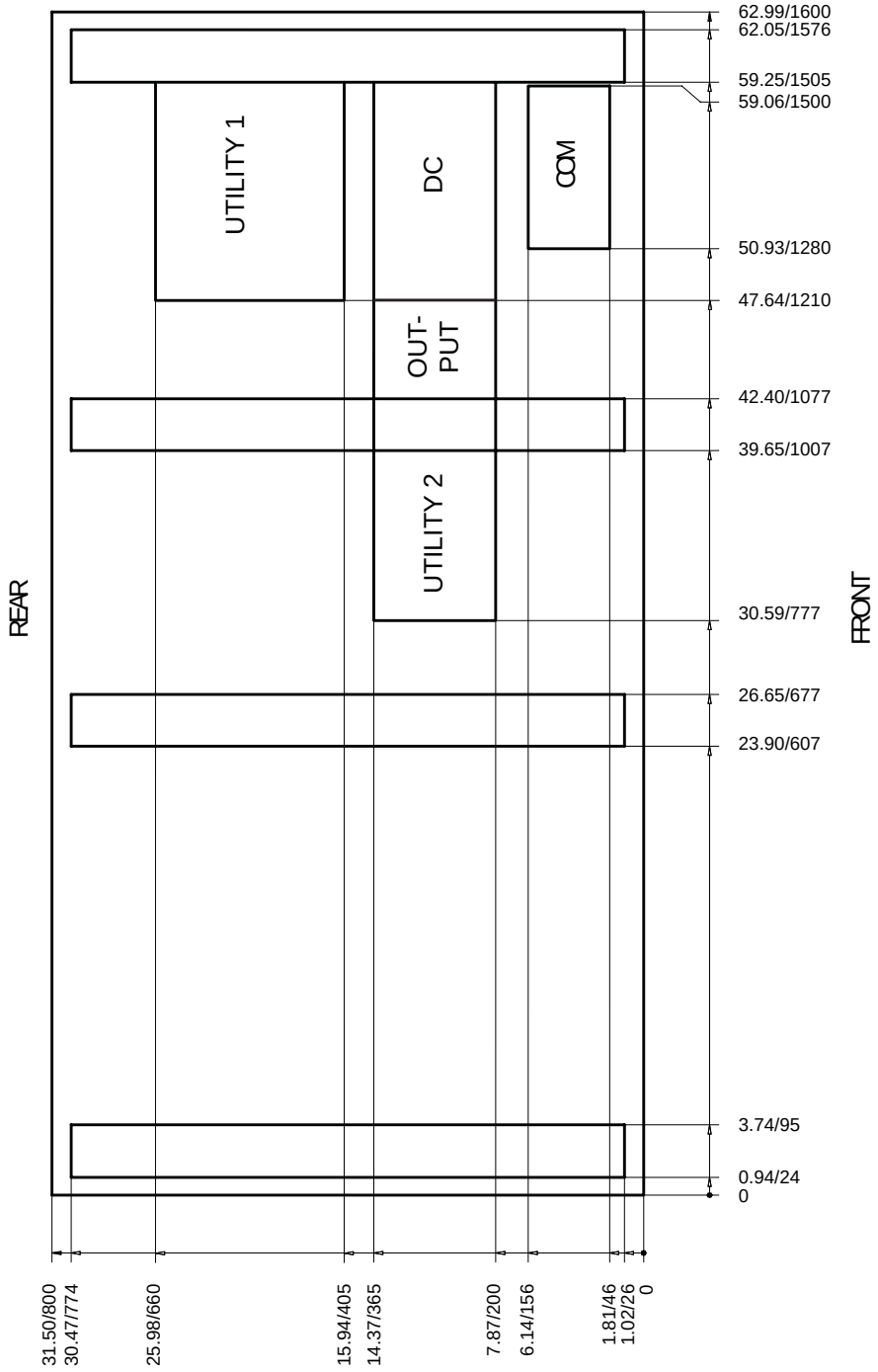
Cubicle



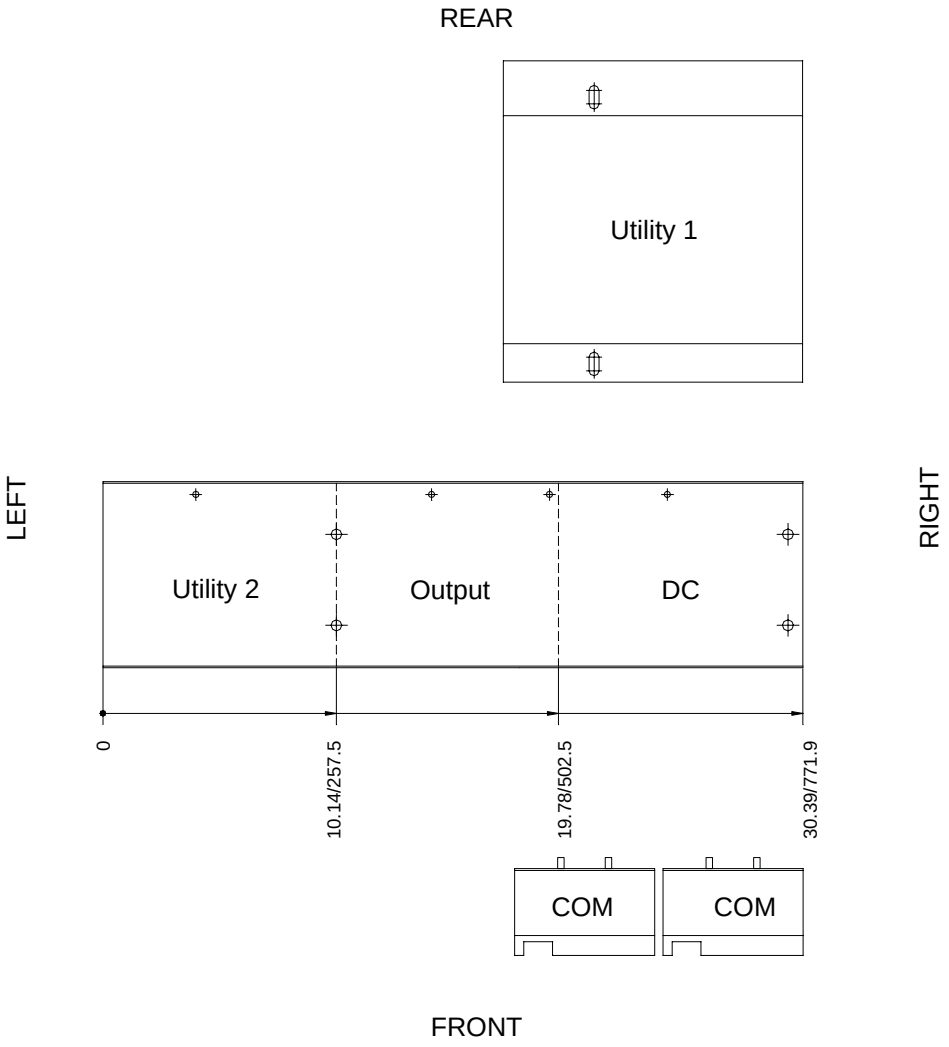
3.3 Foot Prints

3.3.1 Foot prints Silcon DP3120E–DP3160E – 67.00 / 1600 in./mm cubicle

NOTE:
Dimensions in drawings are stated in inches / millimeters respectively.

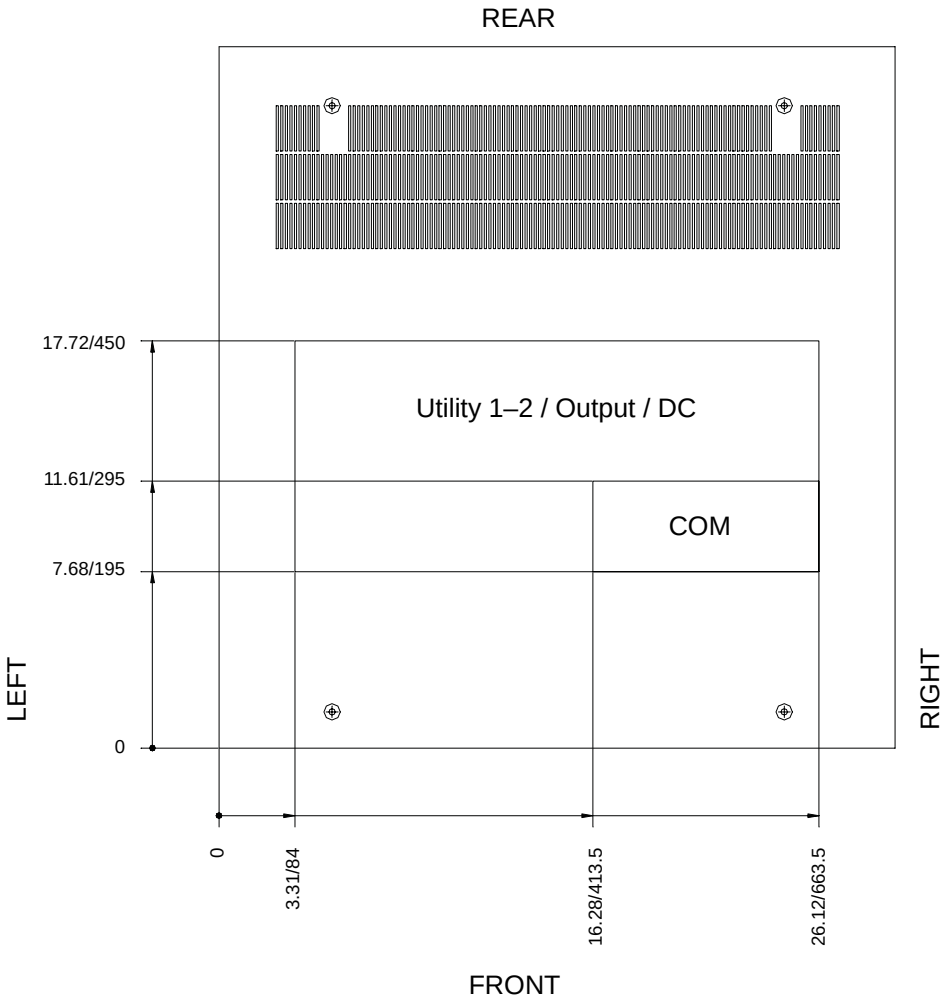


3.3.2 Conduit entrance plate in bottom of the system



For cable entry, holes will need to be punched into the UPS. Follow the diagram for proper orientation of the power and control wires to be brought into the UPS.

3.3.3 Top cable entry



For cable entry, holes will need to be punched into the UPS. Follow the diagram for proper orientation of the power and control wires to be brought into the UPS.

WARNING!
Before continuing, read the warnings on page 2 of this manual.

NOTE!
Always separate AC, DC, and communication cables. See chapter 4.1.3.

4.0 Connection

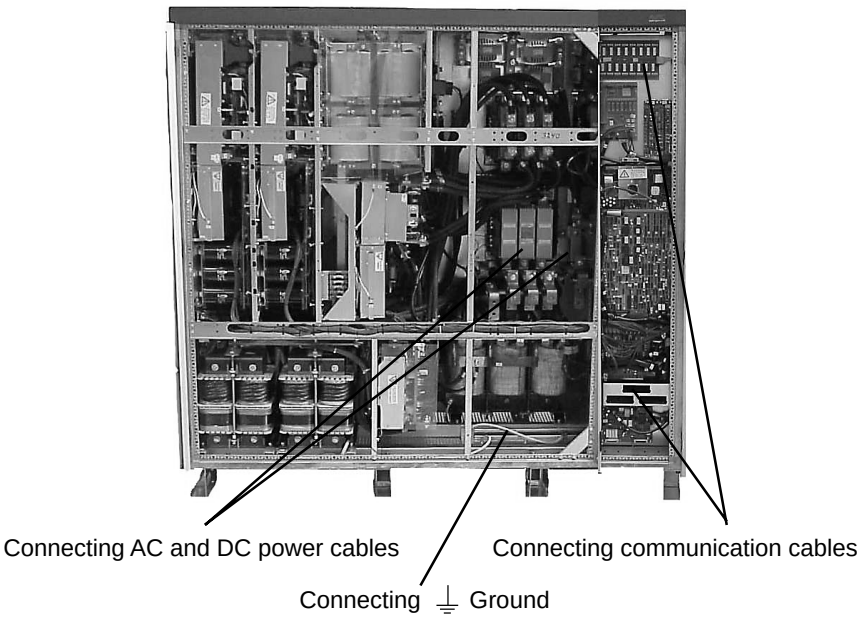
4.1 Connecting the Silcon DP300E

This section is for connecting the UPS unit itself. Before connection, refer to section 5.0 Options/Accessories to ensure that the UPS and options are properly interfaced together during the installation process.

4.1.1 Connecting Silcon DP3120E–DP3160E [480V]

To get access to the cable terminals open the front door.
There are 4 front covers. Remove the screws and lift off the front covers.
Power cable entry from the bottom remove front cover no. 2 and 3, power cable entry from the top, remove front cover no. 1 and 2. Communication cable for system integration interface, parallel, relay boards remove cover no. 4. SmartSlots can be connected without removing covers.

UPS system without cover and doors



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NOTE:
This UPS must be fed from a grounded WYE service, 3 or 4 wire to UPS.

NOTE:
UPS system must be fed with an A-B-C clockwise rotation.

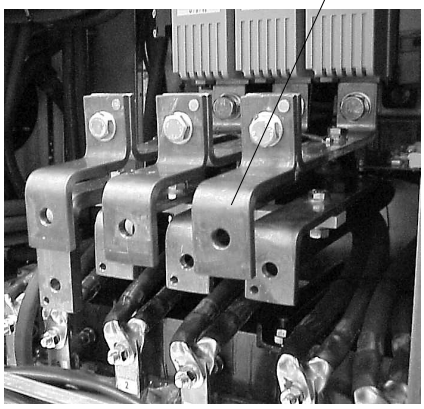
NOTE:
UPS input and UPS output conductors must be in separate conduits.

NOTE:
UPS AC and DC conductors must be in separate conduits.

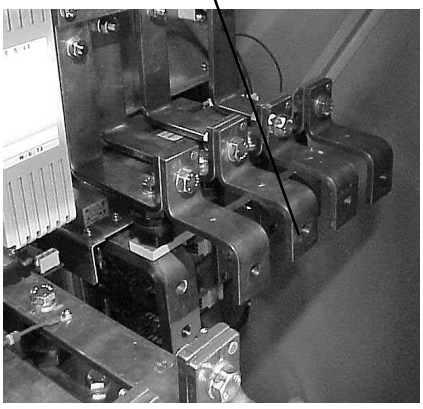
NOTE:
Battery 1 and battery 2 DC conductors must be in separate conduits.

NOTE:
UPS power conductors and UPS control wiring must be in separate conduits.

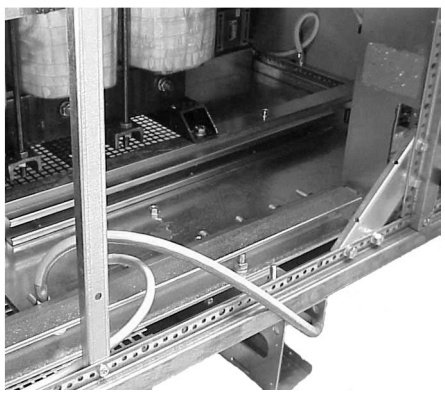
4.1.2 Connecting AC and DC power cables



Top bar – Utility 2 (L1, L2, L3)
Bottom bar – Output (N/E, L1, L2, L3)



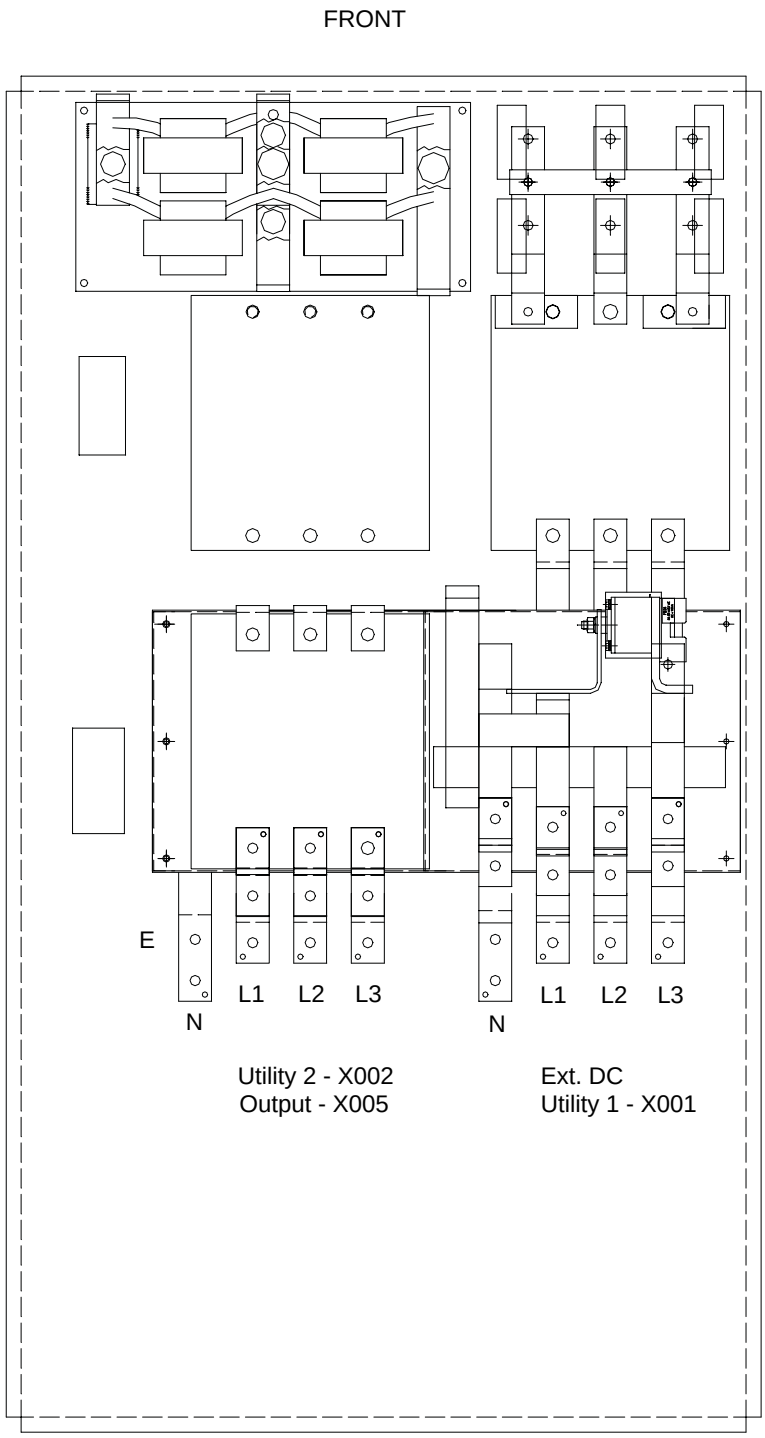
Top bar – Ext. DC (X003 ±, X004 ±)
Bottom bar – Utility 1 (N, L1, L2, L3)



⏚ connection in the bottom of the cabinet

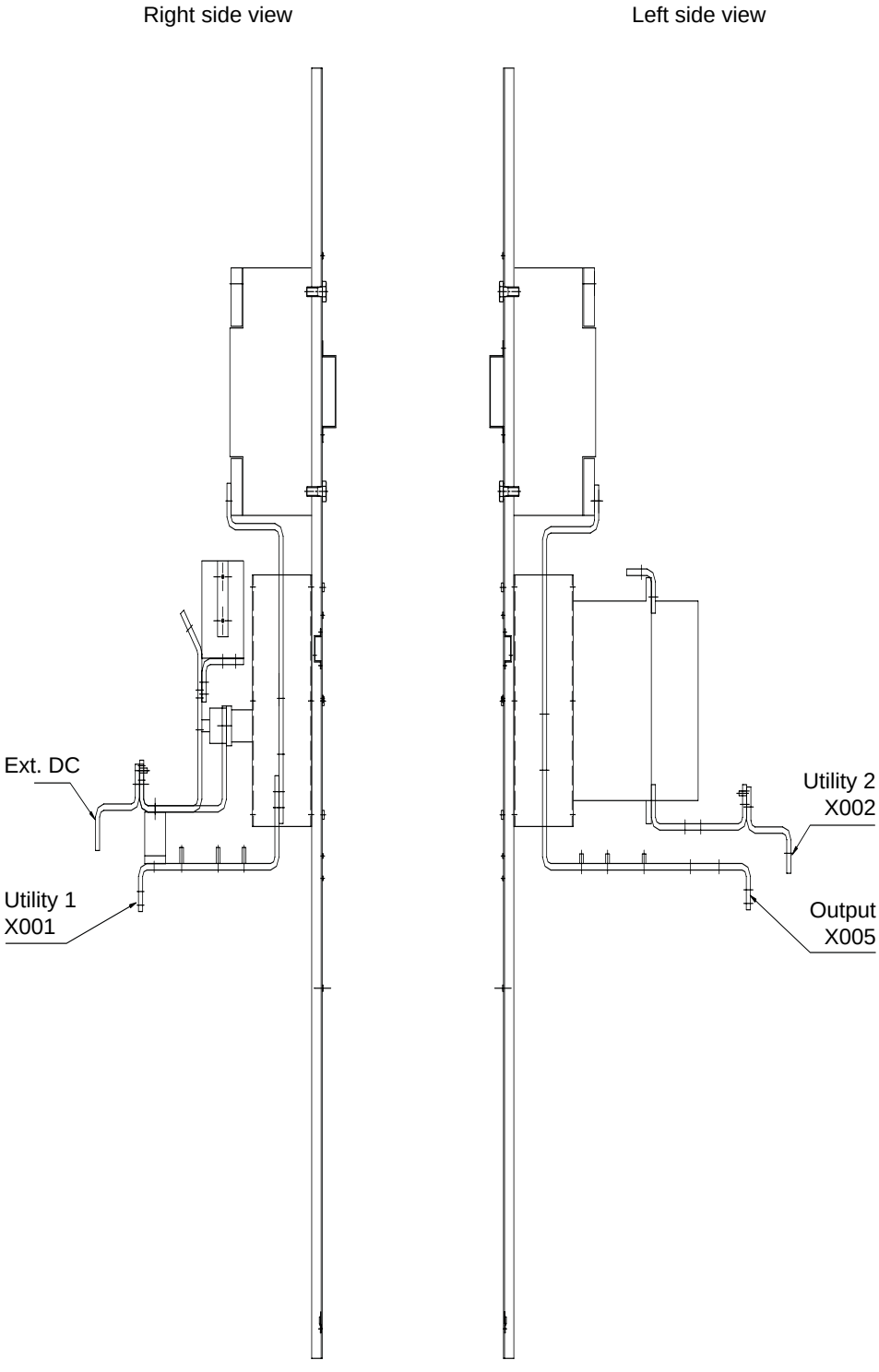
Connection

Dual utility connection



NOTE:
Ground connection in the bottom of the cabinet.

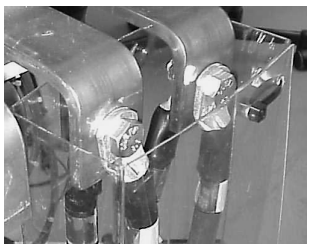
Connection

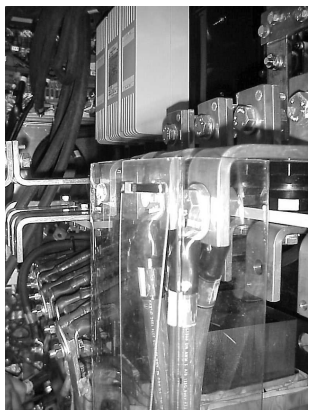


NOTE:
Ground connection in the bottom of the cabinet.

4.1.3 Separation of AC from DC1 and DC2

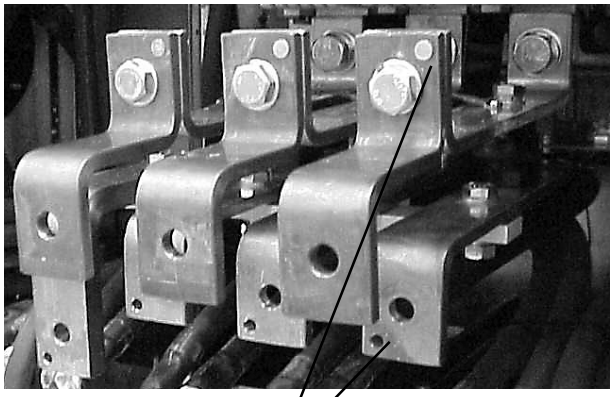
Two pieces of polycarbonate are supplied along with the UPS and are used for separating the AC from DC1 and DC2. The length of the polycarbonate is delivered as standard top entry.
If bottom entry is used, the polycarbonate has to be cut for proper installation.



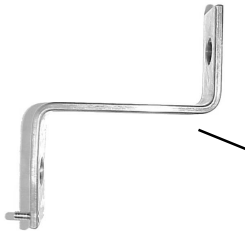


4.1.4 Top or bottom entry

If top cable entry is used, the copper angle bar has to be moved to bottom.



Unscrew bolt, take out the split, move the angle bar down, insert split, and tighten the bolt.



Angle bar

4.1.5 Dual and single utility supply

WARNING!

UPS units contain hazardous AC and DC voltages. A qualified electrician must install the UPS, AC line service, and external batteries according to national and local codes and must be familiar with batteries and battery installation.

Before installing, maintaining, or servicing the UPS, shut off the UPS and disconnect all sources of AC and DC power.

The installer must provide each external disconnecting device for this UPS system with labels having the following wording:
“According to local/national codes for working on electrical equipment”.

Isolate the Uninterruptible Power Supply (UPS) as instructed in this guide before working on the circuit.

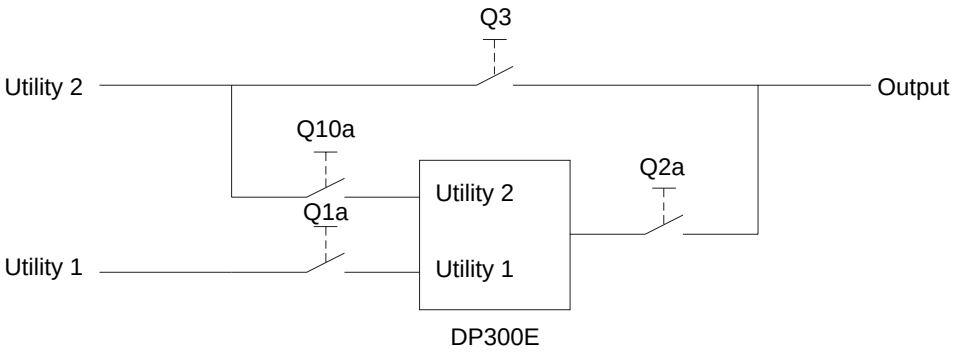
Whenever AC and/or DC voltage is applied, there may be AC voltage at the UPS output; this is true because the UPS can supply output power from utility or from its batteries. To avoid equipment damage or personal injury, always assume that there may be voltage at the UPS output.

This system is equipped with an auto-start function. If activated the system may start without warning. Please refer to chapter 4: “Programming parameters” in User Guide to ensure de-activation.

All Silcon DP3120E – DP3160E comes with dual utility input as standard. If dual utility does not appear or if it not needed, a small modification has to be made in the system, see chapter 4.1.6 for changing from dual to single utility input.

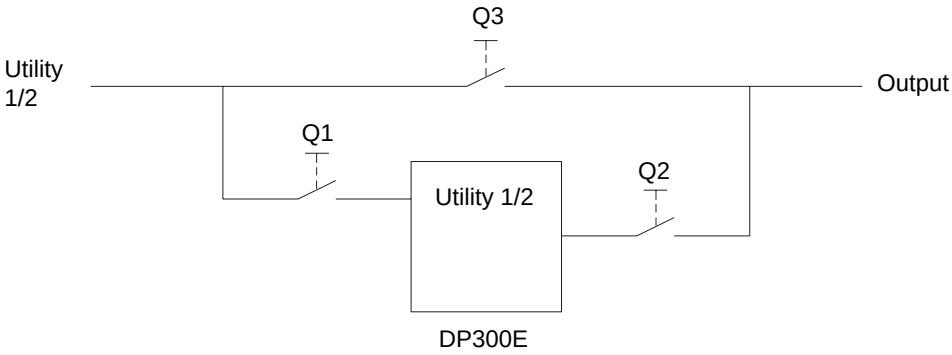
NOTE:
Max. phase shift between utility 1 and 2, less than ±3 degrees. Utility 1 and 2 voltage and frequency tolerance, see specification in chapter 6. Utility 1 supports the load in normal operation, and utility 2 supports the load through the static and service bypass switch.

Working principle of dual utility (2 utility supplies):



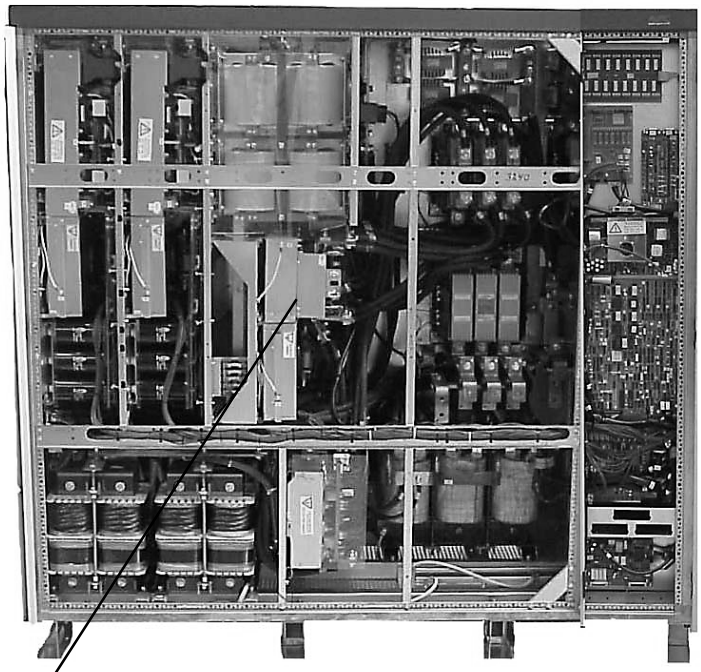
NOTE:
Utility 1 and 2 voltage and frequency tolerance, see specification in chapter 6. Utility 1 or 2 support the load in normal operation and the load through the static and service bypass switch as well.

Working principle of single utility (1utility supply):



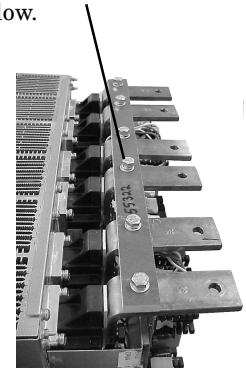
4.1.6 Changing from dual to single utility input

Follow below the description for changing from dual to single input.

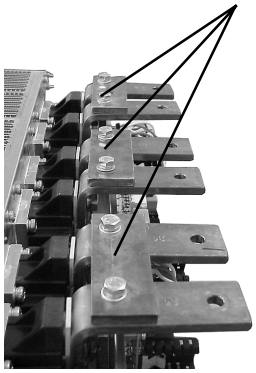


In the **static switch** the following modifications have to be made for single utility input.

1. Remove **fiber bar** (55322) by unscrewing bolts and by mounting **copper bars** as below.

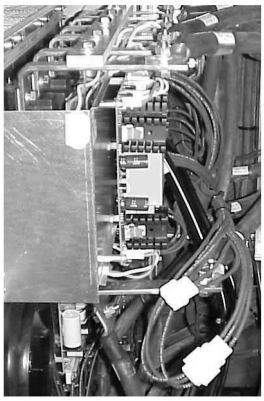


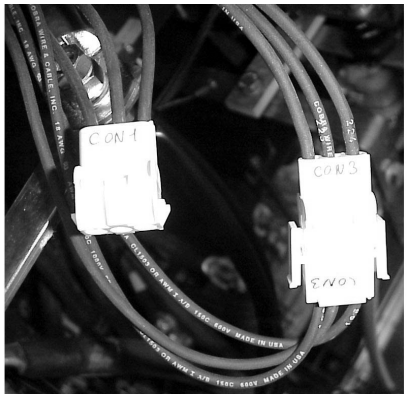
Dual utility



Single utility

2. Change around the **connector** in Con3 to Con1.





Connection

NOTE:
This UPS is intended to be supplied from a grounded **WYE –service**, either 3 or 4 wire.

NOTE:
With 3 wire input, the UPS can only be loaded 3 wire (phase to phase.

NOTE:
Ensure clockwise rotation of utility input voltage!! Max. power cable size: 500 kcmil.

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

NOTE:
Conduit entrance plate in bottom of system must be mounted.

WARNING:
At 100% non linear load the neutral shall be rated for 173% output phase current.

NOTE:
f is symbol for “phase”.

is symbol for “risk of electric shock”.

Terminal for Equipment Grounding Conductor is marked:

Terminal for Grounding Electrode Conductor is marked “E”.

NOTE:
The terminals marked

and

are electrically connected to the terminal marked “E”.

NOTE:
Grounding, please refer to local legal provisions.

External power conductors and overcurrent protection					
System	AC Utility 1 MCCB [A] a)	AC Utility 1 conductors per phase b)	AC Utility 2 & Output MCCB [A] a)	AC Utility 2 & Output conductors per phase b)	Conductors for equipment grounding
DP3120E – 480V	250	250 kcmil	200	4/0 AWG	c)
DP3160E – 480V	300	400 kcmil	250	300 kcmil	c)

External power conductors and overcurrent protection			
System	AC Output grounding electrode conductor	Battery MCCB [A] d)	DC Conductors per battery pole b)
DP3120E – 480V	e)	200	2 x 1/0 AWG
DP3160E – 480V	e)	250	2 x 3/0 AWG

a) Input must be limited to less than 50KAIC.

b) Cable sizes refer to US National Electric Code.

All cables rated for 125% * nominal currents.

For linear load neutral cables must be rated like the phase cables.
For non-linear load neutral cables must be rated for $I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$ and phase cables must be redimensioned.

All cables rated for 600V.

The tabled configurations are routed in conduits as follows:

AC Utility 1:	1 conduit with 3 phases, neutral, and equipment ground
AC Utility 2:	1 conduit with 3 phases, neutral, and equipment ground
AC Output:	1 conduit with 3 phases, neutral, and equipment ground
	1 conduit with grounding electrode conductor (not for 4-wire system)
DC:	Battery 1:1 conduit with +, +, –, –, and equipment ground each
	Battery 2:1 conduit with +, +, –, –, and equipment ground each

UPS power conductors and UPS control wiring must be in separate conduits.

As regards recommended cable lugs and crimping tool, see section 4.1.6.

c) Routed in each of the power cable conduits for the connected equipment.
Cable sizes refer to NEC.

As regards recommended cable lugs and crimping tool, see section 4.1.6.

d) Alternate suppliers of battery cubicle must be Listed by Unterwriters Laboratory.
When APC battery cubicle is not used, the proper DC disconnects/overcurrent must be used in accordance with the APC Design Guide.

e) Routed in one separate conduit.

Cable sizes refer to NEC.

As regards recommended cable lugs and crimping tool, see section 4.1.6.

4.1.6 Recommended cable lugs and crimping tools, manufacturer FRAMATOME CONNECTORS INTERNATIONAL (FCI)

Cable Size [AWG]	Terminal bolt diameter 6mm		
	Cable lug Type	Crimping tool	
		Tool	Die
14	YAV10-2TC14	Y8MRB-1	Groove 2
12	YAV10-2TC14	Y8MRB-1	Groove 2
10	YAV102TC14	Y8MRB-1	Groove 2
8	YA8CL2TC14	Y8MRB-1	Groove 2
6	YA6CL2TC14	Y2MR	Blue Die

Cable Size [AWG]	Terminal bolt diameter 8mm		
	Cable lug Type	Crimping tool	
		Tool	Die
8	YA8CL2TC38	MD7-34R	W8CVT
6	YA6CL2TC38	MD7-34R	W5CVT
4	YA4CL2TC38	MD7-34R	W4CVT
3	YA3CL2TC38	Y35	U3CRT
2	YA2CL2TC38	MD7-34R	W2CVT
1	YA1CL2TC38	MD7-34R	W1CVT
1/0	YA25L2TC38	MD7-34R	W25VT
2/0	YA26L2TC38	MD7-34R	W26VT
3/0	YA27L2TC38	MD7-34R	W27VT
4/0	YA28L2TC38	MD7-34R	W28VT
250kcmil	YA29L2TC38	MD7-34R	W29VT

Cable Size [AWG]	Terminal bolt diameter 12mm		
	Cable lug Type	Crimping tool	
		Tool	Die
3/0	YA272LN	MD7-34R	W26VT
4/0	YA282LN	MD7-34R	W28VT
250kcmil	YA292LN	MD7-34R	W29VT
300kcmil	YA302LN	MD7-34R	W30VT
350kcmil	YA312LN	MD7-34R	W31VT
400kcmil	YA322LN	MD7-34R	W32VT
500kcmil	YA342LN	MD7-34R	W34WT

4.1.7 Grounding

4.1.7.1 System grounding

If none of the UPS neutral inputs are connected to a grounded service neutral conductor per NEC per local code requirement, provisions have to be made as follows:

a. The bonding wire is mounted between output terminals X005:N/E and equipment ground bar in bottom of unit.

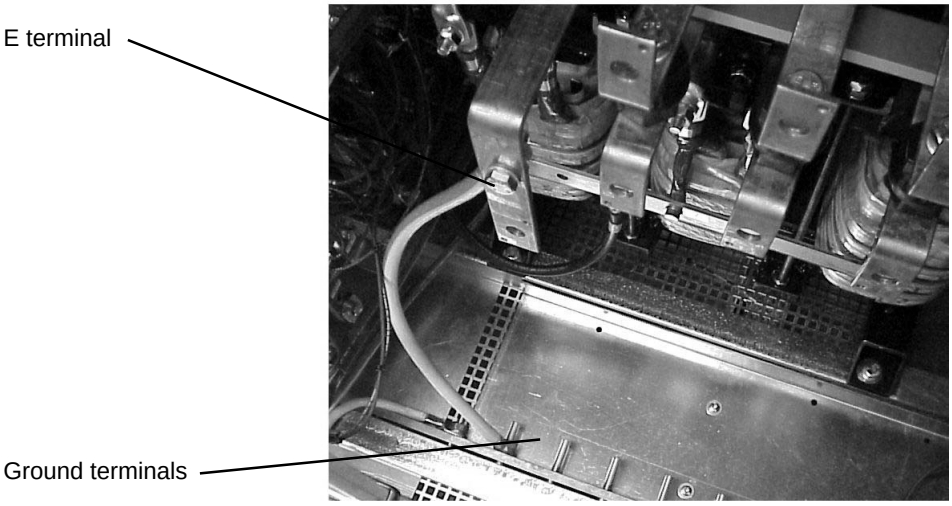
b. The output terminal X005:E/N and “Grounding electrode terminal”, are both connected by the grounding electrode conductor to a local grounding electrode per NEC per local code requirement.

4.1.7.2 Equipment grounding

Terminals marked ⏚ are intended for equipment grounding.

Provisions have to be made as followed:

- The input equipment ground terminal(s) shall be connected to the grounding electrode(s) provided for the service entrance(s).



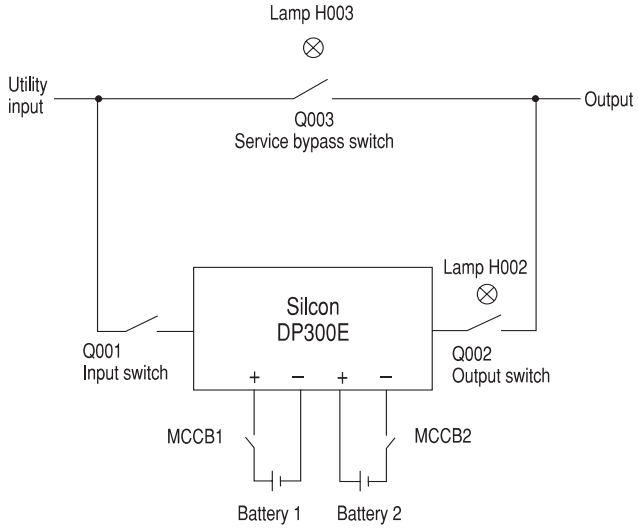
4.2 System Integration Interface

4.2.1 Introduction

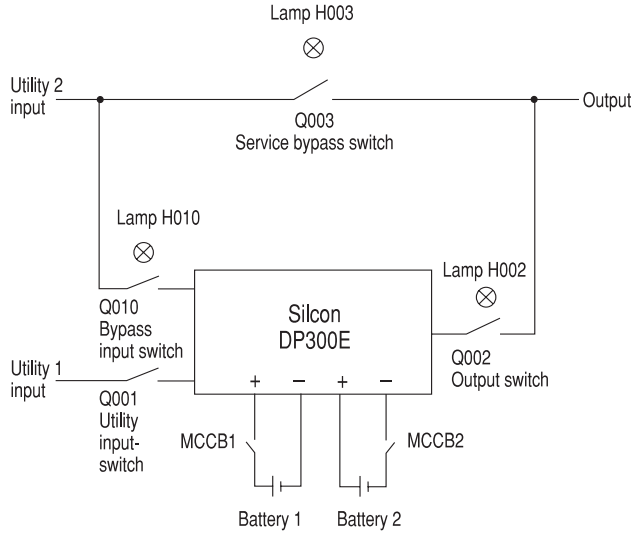
NOTE:
Use of the same designations in your diagrams make information exchange much easier.

NOTE:
Refer to chapter 4.1.6 Changing from dual to single utility input.

Single Utility



Dual Utility



WARNING!
System Integration Interface can receive high voltage from external alarm and signal circuit field wiring even if all AC and DC sources are off.

The system Integration Interface (SII) is the control link between the UPS and the system main switches as shown in the above diagram. The purpose is to ensure correct operation of the switches without loosing the system output power.

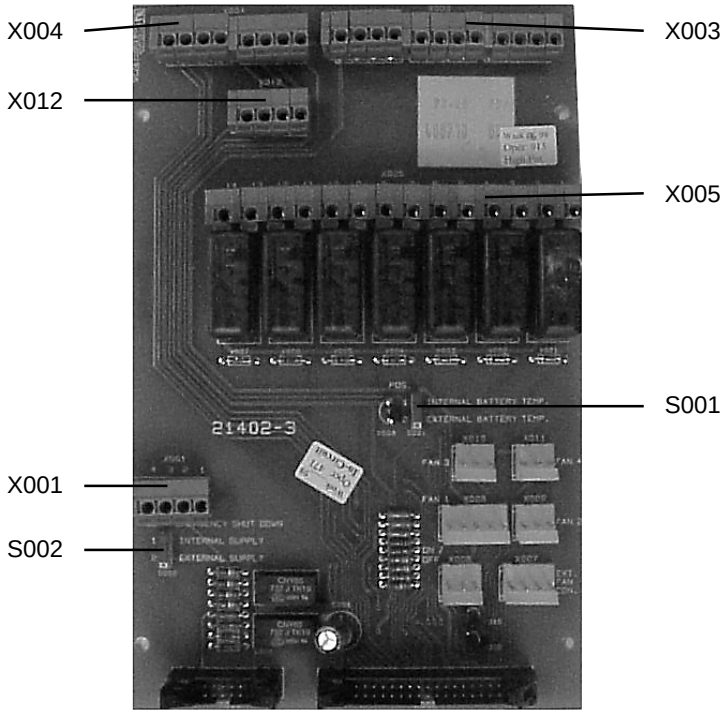
Position information from auxiliary contacts on the main switches are the inputs for the SII-board and the outputs are the lamp signals giving “the green light” for operating the specific switches.

Besides previous mentioned the SII-board also have input facilities for emergency shut down and temperature compensation of the charge voltage for external battery (used together with the battery monitor, see also User Guide). “Battery operation” and “Common fault” are the two main status relay signals also coming from the SII-board.

NOTE:
When installing UPS systems with Emergency Power Off (EPO) all input sources must be provided with disconnecting device when activating EPO

4.2.2 Connections

System Integration Interface



Remarks:

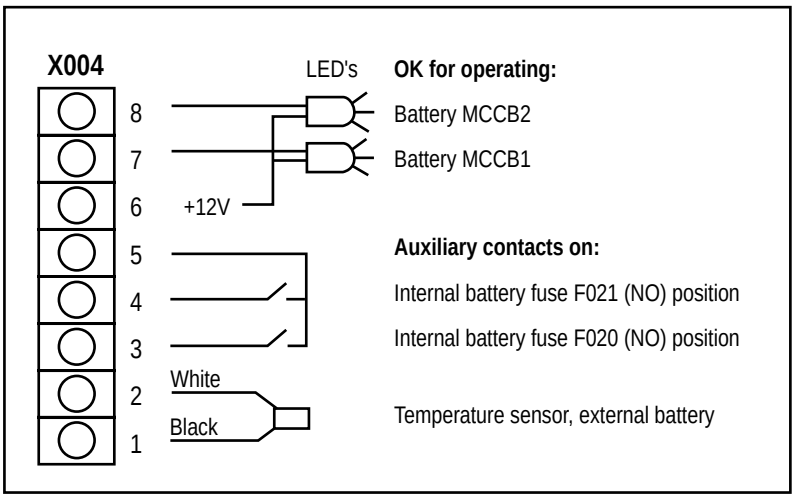
X003 and X004, auxiliary contacts:
When switching Q001, Q002, Q010, MCCB1, and MCCB2 from “ON or 1” to “OFF or 0” the auxiliary contacts have to give a signal before the corresponding utility switch is opened. When switching from “OFF or 0” to “ON or 1” the auxiliary contact has to be activated with max. 0.5 sec. delay from the corresponding main switch.
When switching Q003 from “OFF or 0” to “ON or 1” the auxilliary contact has to give a signal before Q003 is closed. When switching from “ON or 1” to “OFF or 0” the auxilliary contact has to be activated with max. 0.5 sec. delay

NOTE:
All alarm and signal circuit field wiring shall be rated 300V minimum.

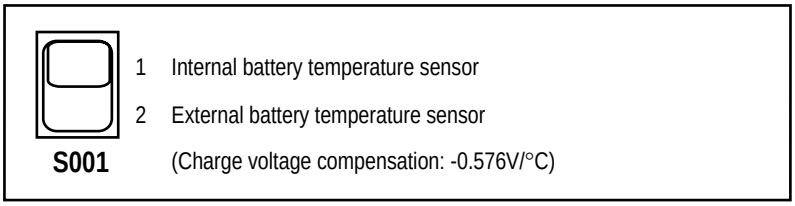
X005, output relays:
The battery operation signal is 30 secs. delayed, but inhibited during battery tests. The common fault relay is delayed. Standard factory setting is 0 sec., however other periods can be programmed as described in User Guide chapter 4.
Same phase as power source for the output relays is mandatory for voltages above 170V.

Terminals X001, X003, X005, X004, X012:
Cable size AWG18 to AWG14, use solid copper conductors only.

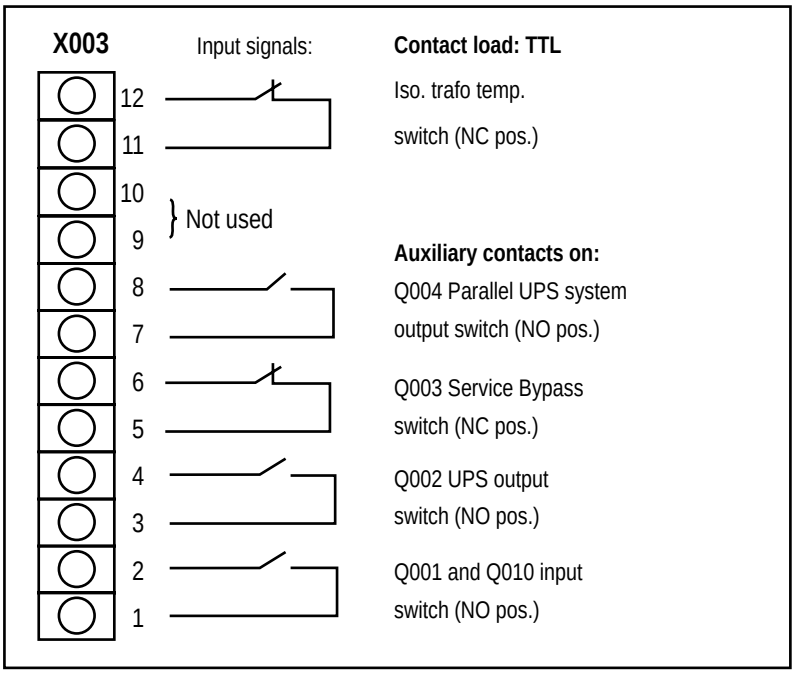
X004



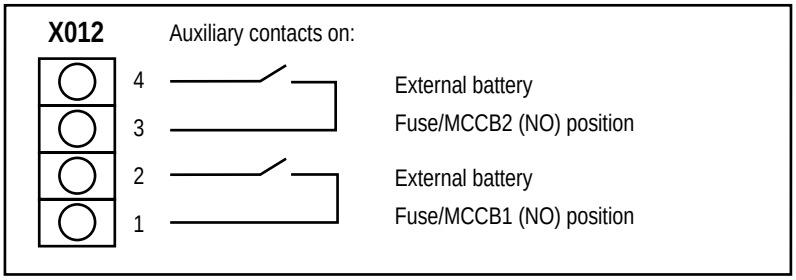
S001



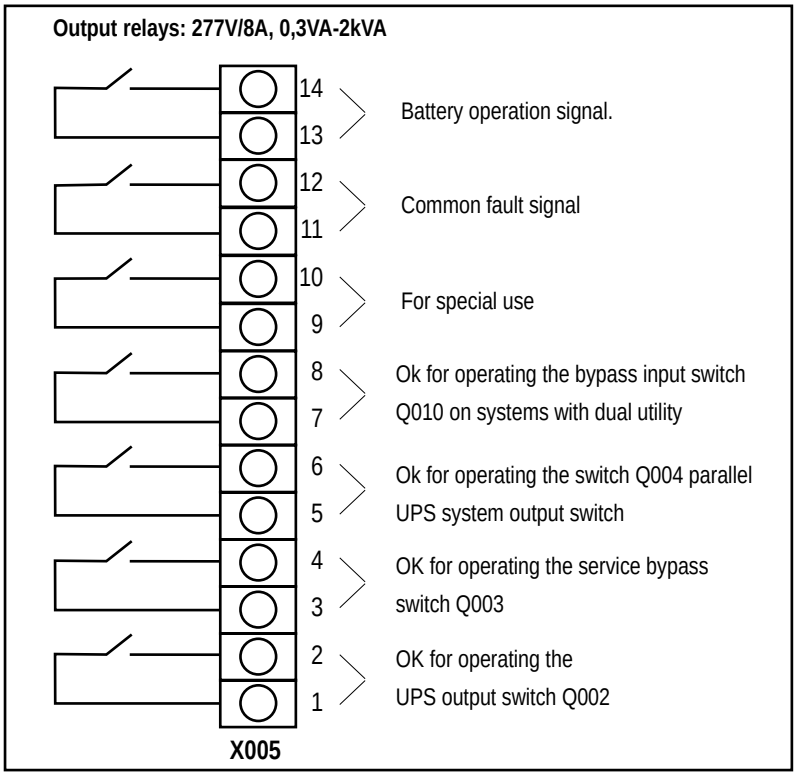
X003



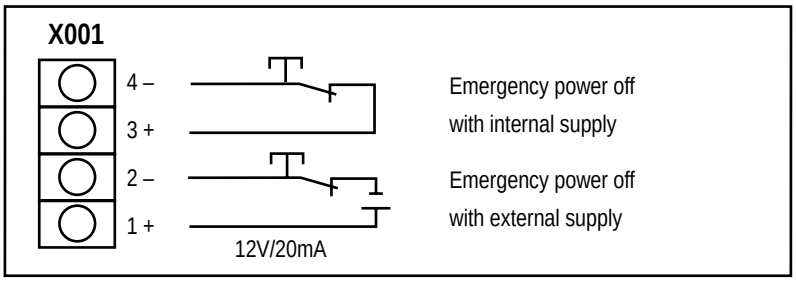
X012



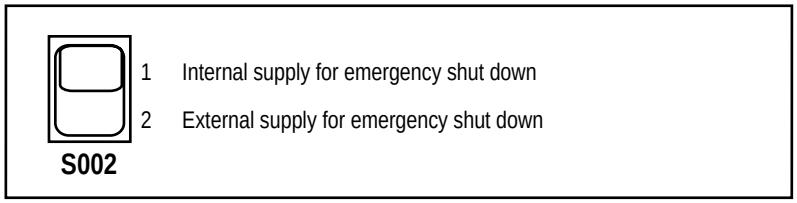
X005



X001



S002

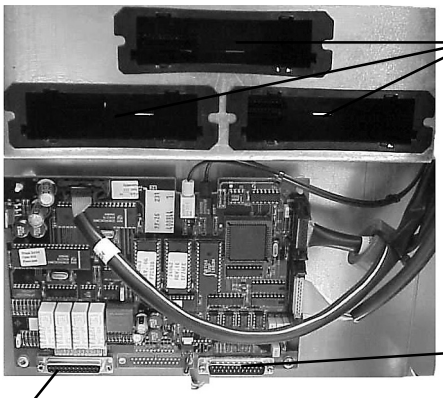


4.3 Communication interface – ComInterface

4.3.1 Introduction

The ComInterface having 2 ports - is used when an interaction between UPS and e.g. a computer system has to be established. The main purpose is to ensure monitoring and if needed, a controlled shut down of the computer in case of failures in the utility supply.

4.3.2 Connections



	Contacts between:	UPS status:
14	2-14	The UPS is OFF, no output voltage
15	2-15	The UPS is ON, output voltage present
2		
16	4-16	The UPS is not in bypass operation
17	4-17	The UPS is in bypass operation
4		
18	6-18	The UPS is not in battery operation
19	6-19	The UPS is in battery operation
6		
20	8-20	The UPS battery voltage is above the warning level
21	8-21	The UPS battery has been discharged to the warning level
8		
13 +		Input for remote shutting down of the UPS
25 –		Signal required: 3.5-25V pulse for min. 1 sec.
Relay contacts rating:		Max 42VAC or 60VDC Min. 0.01A, Max. 0.5A

4.4 SmartSlot for Silcon DP3120E – DP3160E

A UPS system alone provides excellent protection from brief power problems. However, during an extended power outage an unattended computer system will eventually shut down due to battery capacity exhaustion. To prevent data corruption when the UPS shuts down, the computer must be informed by the UPS of impending shut down and take appropriate file-saving measures. This important function is called UPS monitoring. The UPS's computer interface port is the means by which your UPS communicates with a computer system.

Some computer operating systems have built-in UPS monitoring. These systems require various hardware interfaces. Interface kits for all major operating systems that support UPS monitoring are available from your dealer.

APC SmartSlot for Silcon DP300E Series UPS's has been designed for reliable and maintenance-free service in combination with your American Power Conversion (APC) Silcon DP300E Series uninterruptible power supply (UPS).

4.4.1 SmartSlot Accessories

SmartSlot at the front of the frame accomodate up to 3 accessory cards. Before installing any SmartSlot accessory, ensure it is a compatible "Silcon DP300E OK" model.

1. Share-UPS TM, provides automatic shutdown of up to two additional servers.
2. Measure-UPS TM II, provides environmental information such as ambient temperature and humidity.
3. Call-UPS TM, works with an external modem to provide out-of-band UPS manegement
4. WEB/SNMP Management card, provides web based UPS management.

4.4.2 Multiple SmartSlot Installation - introduction

If your UPS configuration uses more than one SmartSlot device, you must install them in the correct order for them to work together properly.

Priority of SmartSlot devices:
A SmartSlot device with higher priority is to be placed in the SmartSlort accessory slot with the higher number. Refer to the following table.

Priority of APC accessories:
Install SmartSlot accessories as dictated by the following table. An accessory with higher priority is to be placed in the accessory slot with the higher number.

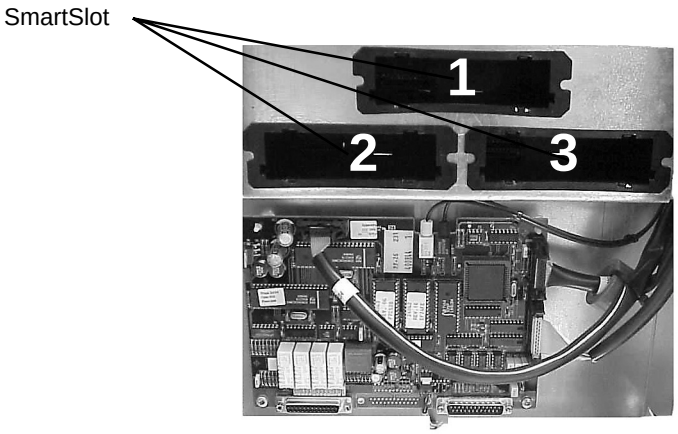
Accessory	P/N	Priority	Position
Web/SNMP Management Card	AP9606S	Highest	High–numbered slot
Call-UPS ® //	AP9608	Second-highest	
Interface expander	AP9607	Second–lowest	
Measure-UPS ® //	AP9612T AP9612TH	Lowest	Low–numbered slot

Installing accessories – procedure:
To install accessories, perform the following steps.

1. Make sure that the Silcon DP300E is powered off.
2. Install the SmartSlot accessories into the housings on the front of the chassis. See the instructions supplied with the accessories and “Priority of APC accessories.”

If your UPS has one SmartSlot accessory slot
If your UPS has exactly one SmartSlot accessory slot, use this accessory slot for the SmartSlot device with the lowest priority.

Installation in the Silcon DP3120E and DP3160E
For installation of multiple SmartSlot devices in the Silcon DP3120E and DP3160E, refer to the numbering shown in the figure that follows:



4.5 Installing the UPS in a computer room

If installing the UPS system in a computer room the following **MUST** be provided at installation site:

1. – The system can only be installed with external batteries.
   – Alternate supplier's battery cubicle must be UL Listed. If used in computer room it must be approved for use in computer room.
   – When APC battery cubicle is not used, the proper DC disconnects/overcurrent must be used in accordance with the APC Design Guide.
   – If alternate supplier's batteries are installed in the computer room, please note that the batteries must be R/C (BAZR2) and have a flame rating of UL94V2 or UL94V1 or UL94V0.

2. The system must be provided with switch gear.
   The switch gear must contain trip function for all switches for Emergency Power Off function. See principal diagram.

3. The system must be provided with Emergency Power Off function.
   The EPO must disconnect all AC and DC sources. See principal diagram.

When pushing the EPO switch, the UPS switches to system off. All switches in the switch gear are tripped. UPS will discharge capacitors within 5 minutes.

In connection with yearly service it is recommended to test the EPO-function.

APC recommend that noise level is measured in computer room after installation, with all equipment in operation (UPS, computers, servers, printers, air conditioning, etc.) and if needed, necessary precaution is taken according to Occupational Noice Exposure recommendation".

4.5.1 Principal for EPO

Diagram shows the Emergency Power Off (EPO) principal, and has to be established in connection with the EPO- and UPS-installation. MCCB's and switchgear must be installed with "shunt trip".

When tripping MCCB's and switches energy must be available. This energy comes from an external power supply, power is supplied from "UTILITY 2", if available, otherwise from "UTILITY 1" and from the output of the UPS before (Q002).

The EPO circuit and the DP300E have interconnection to the pushbuttons, turn system "OFF" and "ON", through the system integration interface card terminals X001, and on the system integration interface card a selection switch S002 for internal or external power supply can be set.

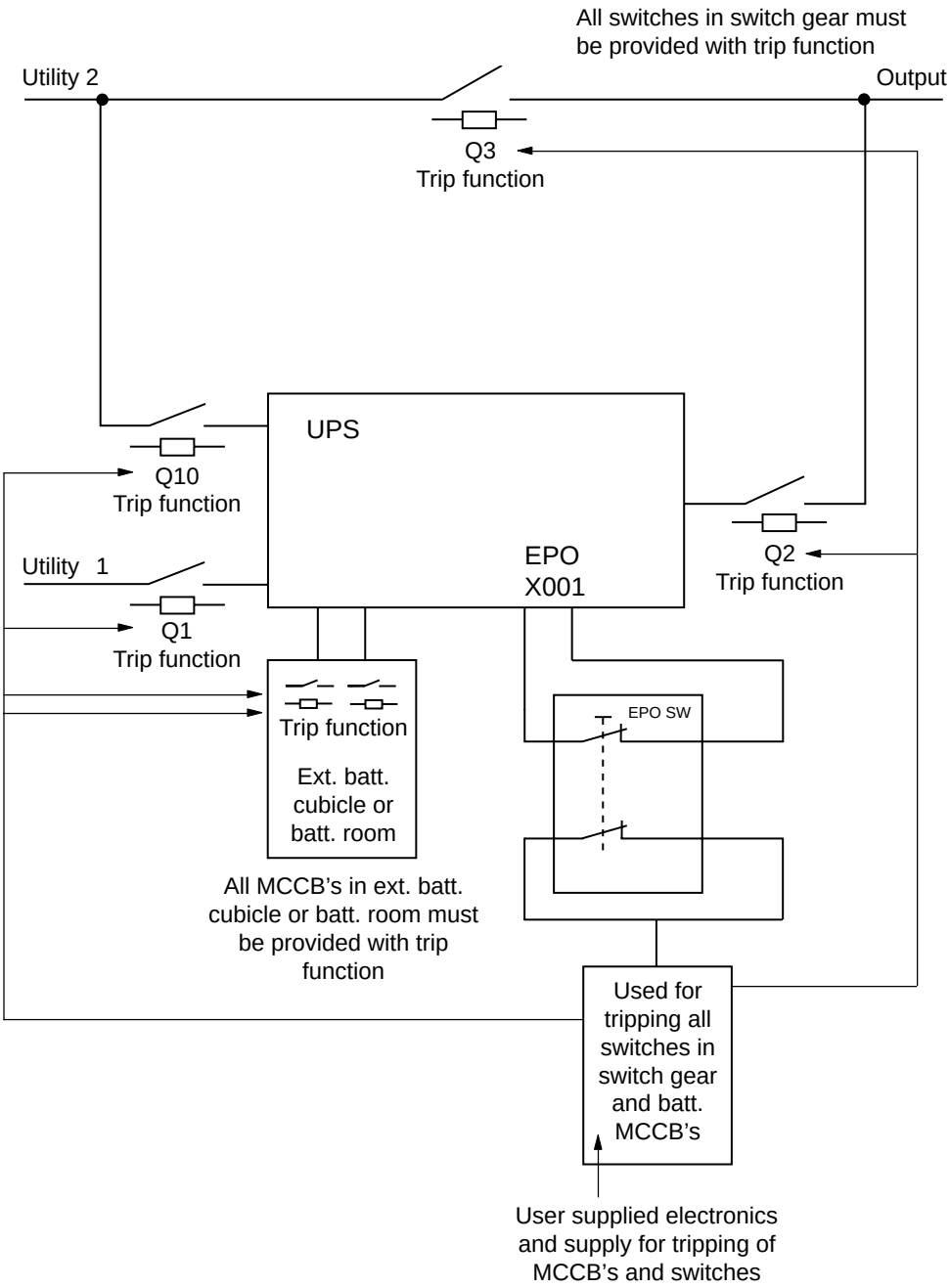
S002

Choose between:	Emergency shutdown connection between:
– Pos. 1, internal supply	X001:3 and X001:4
– Pos. 2, external supply	X001:1, +12V / X001:2, GND

The connected EPO switch must have break function. It may be chosen to supply the current loop of 20mA internally or externally by selector switch S002 on the system integration interface. In case of external supply, a 12Vdc supply or a 20mA current generator has to be used.

The other part of the EPO switch has interconnection to an electronic control system (not supplied by APC), supplying the tripping function in the MCCB and switchgear with an external 277Vac or 480Vac 50/60Hz supply, supported from Utility 2, if available, or Utility 1 and from the output of the UPS before Q002.

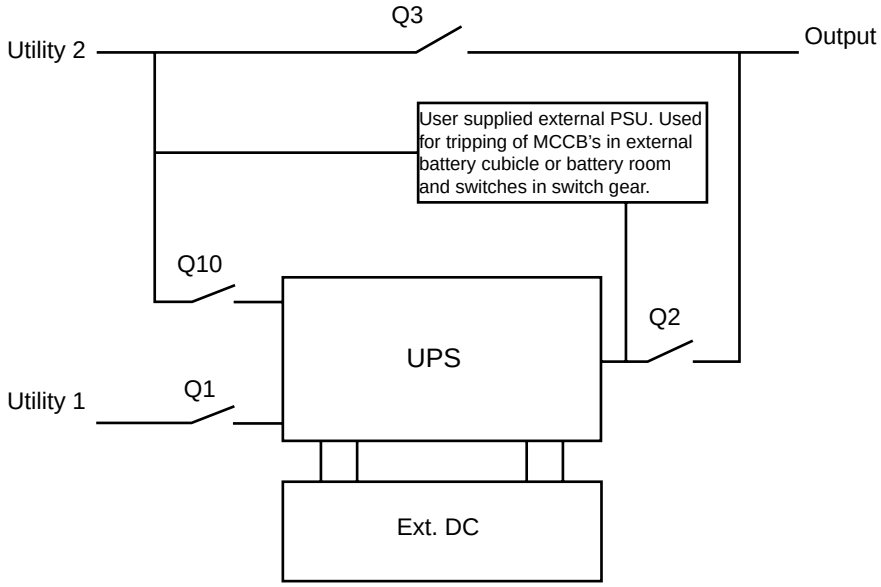
This combination of 2 break function, one for the UPS system and one for external switchgear makes it possible to make a quick shutdown of the total system in case of emergency.



4.5.2 Emergency Power Off (EPO) for Silcon DP300E

If installing the UPS system in a computer room, the installation MUST contain external batteries with MCCB's and switchgear provided with trip function – approved for use in computer room – for EPO tripping of MCCB's and switches. See chapter 4.5.1 for details.

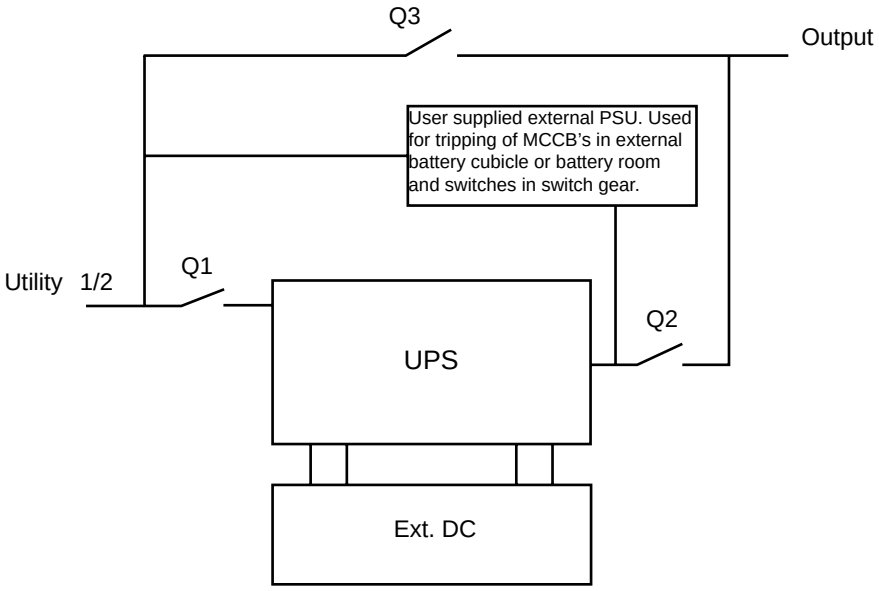
By the following, the system is installed with dual utility.



Matrix dual utility

DC	Utility 2	Utility 1		Operation mode		
0	0	0		Off		Nothing to trip
0	0	1		X		Under installation only
0	1	0		Bypass op.		
0	1	1		Bypass op.		
1	0	0		Batt. op.		
1	0	1		Normal op.		
1	1	0		Bypass op.	Batt. op.	
1	1	1		Normal op.		

By the following, the system is installed with single utility.



Matrix single utility

DC	Utility 1		Operation mode			
0	0		Off			Nothing to trip
0	1		Bypass op.			
1	0		Batt. op.			
1	1		Normal op.	Batt.	Bypass	

4.6 Cubicles for batteries

IMPORTANT SAFETY INSTRUCTIONS

a) Servicing of batteries should be performed or supervised by personel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

b) When replacing batteries, replace with the same number and type as installed. See also the installation guide from battery supplier, on how to install.

c) **CAUTION** - Do not dispose of battery or batteries in a fire. The battery may explode.

d) **CAUTION** - Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

e) **CAUTION** - A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

1) Remove watches, rings, or other metal objects.
2) Use tools with insulated handles.
3) Wear rubber gloves and boots.
4) Do not lay tools or metal parts on top of batteries.
5) Disconnect charging source prior to connecting or disconnecting battery terminals.
6) Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.

The installation and use of this product must comply with all national, federal, state, municipal or local codes that apply. If you need assistance, please *have your UPS model and serial number available* and call APC's toll free technical support at: 1-877-287-7835 (1-877-2UPS-TEK).

You can find additional product information on the APC World Wide Web site at http://www.apcc.com. See **Section: How to contact APC.**

4.6.1 Cubicle for batteries

4.6.1.1 Safety - Warnings

WARNINGS

The total system contains **HAZARDOUS AC/DC VOLTAGES** and is supplied from more power sources. Some terminals and components are live even when the system is switched off!

ONLY qualified electricians are allowed to perform the installation according to national and local codes!

NO Silcon DP300E types are allowed to have built-in batteries when connected to external batteries!

Do **NOT** install batteries that do not follow the specification indicated by APC, otherwise the installer takes over the full responsibility!

Do **NEVER** lift or transport the battery cubicle with batteries installed.

4.6.1.2 Placing

See Installation Guide from battery supplier.

4.6.1.3 Preparing the batteries and the Silcon DP300E

Unpack the batteries, check that the type, no., and size is corresponding to the ordered.

4.6.1.4 Dimensions and weights

See Installation Guide from battery supplier.

4.6.1.5 Mounting the batteries

See Installation Guide from battery supplier.

4.6.1.6 Introduction

Warning

With reference to Local/National Code use:

1. Additional insulating material
2. Insulating tools

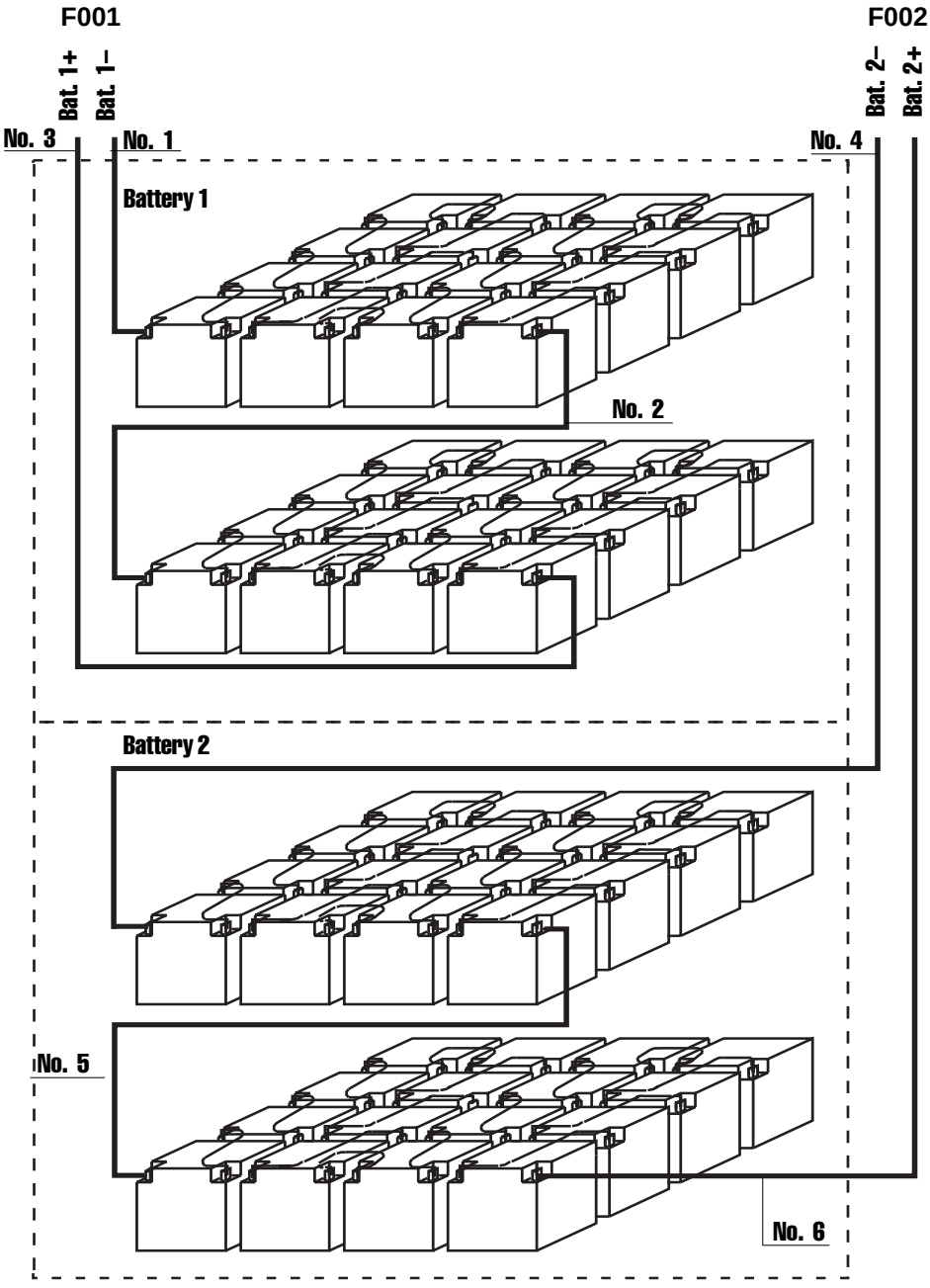
WARNING

The battery bank is sub-divided into two separated DC busses “batteries”:

1. Battery 1 is a series connection of a number of batteries, drawing on next page shows the principle. No. 1 and no. 2 containing 32 batteries (can also be 64, 96, or 128 batteries depending on the total battery solution), return in no. 3, the battery block contains 192 cells and has a nominal voltage of Un = 384Vdc.
2. Battery 2 is a series connection of a number of batteries, no. 4 and no. 5 containing 32 (can also be 64, 96, or 128 batteries), return in no. 6, the battery block contains 192 cells and has a nominal voltage of Un = 384Vdc.
3. Ensure that DC breakers are in position “OFF” or “0”.

NOTE:
See Installation Guide from battery cubicle supplier for installation.

Principal diagram



Connecting the batteries to the Silcon DP300E, see chapter 4 for DC connections.

4.6.1.7 Before Starting-up

WARNING

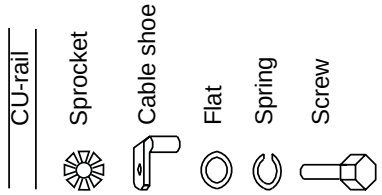
1. Ensure that no electric power supply source has been connected to the Silcon DP300E for at least 5 min.
2. Ensure that DC breakers in cubicle are in position “OFF”.
3. Place the switch S001 on the Silcon DP300E System Integration Interface in the position “External battery temperature sensor”.

4.6.1.8 Connecting the units

Regarding cables – please refer to point 4.0: Connection and to below diagram 4.6.1.9. The following procedure is recommended:

1. Connect the Silcon DP300E terminals X004 and X012 on the System Integration Interface to the terminals X009, X010, and X012 in the battery box. These wires must be separated from the power cables.
2. Connect a possible external trip circuit to the X011 terminal in the battery box.
3. Connect the Silcon DP300E terminals PE, X003, and X004 to the corresponding in the battery box.
4. Mount top and front covers. Mount earth conductor.

NOTE:
Use copper conductor only !

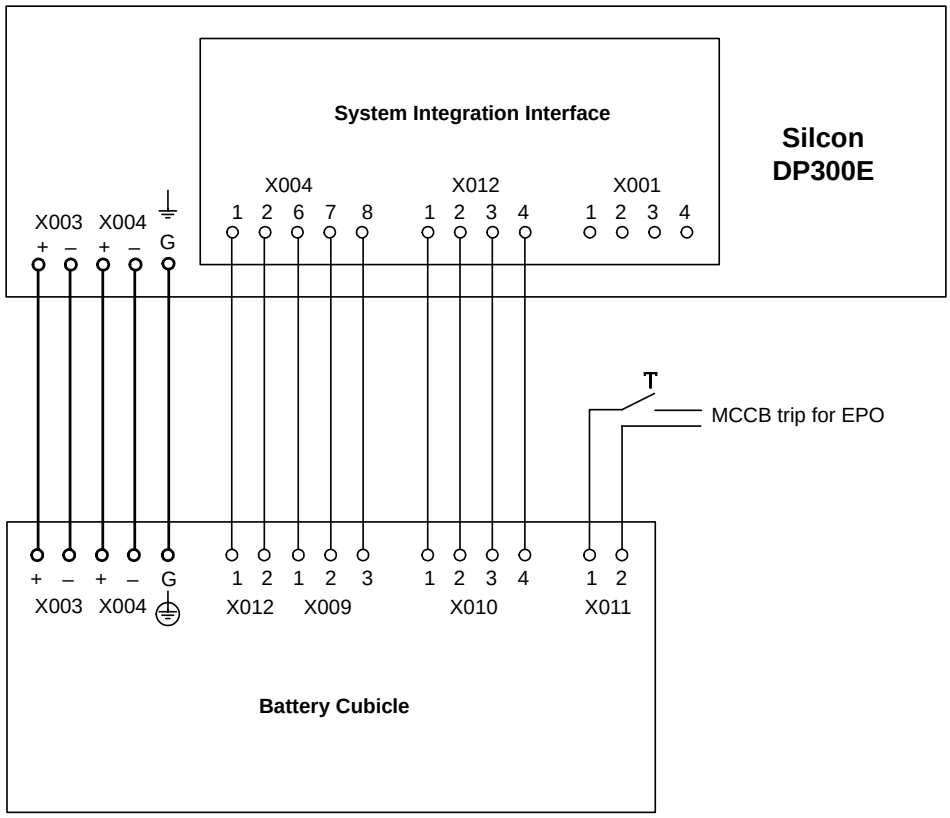


WARNING

5. Follow the described „Starting-up procedure“ in User Guide, when all cables for the total system are in place.
   Do not close MCCB until the display shows: otherwise the system may be damaged.

Close MCB

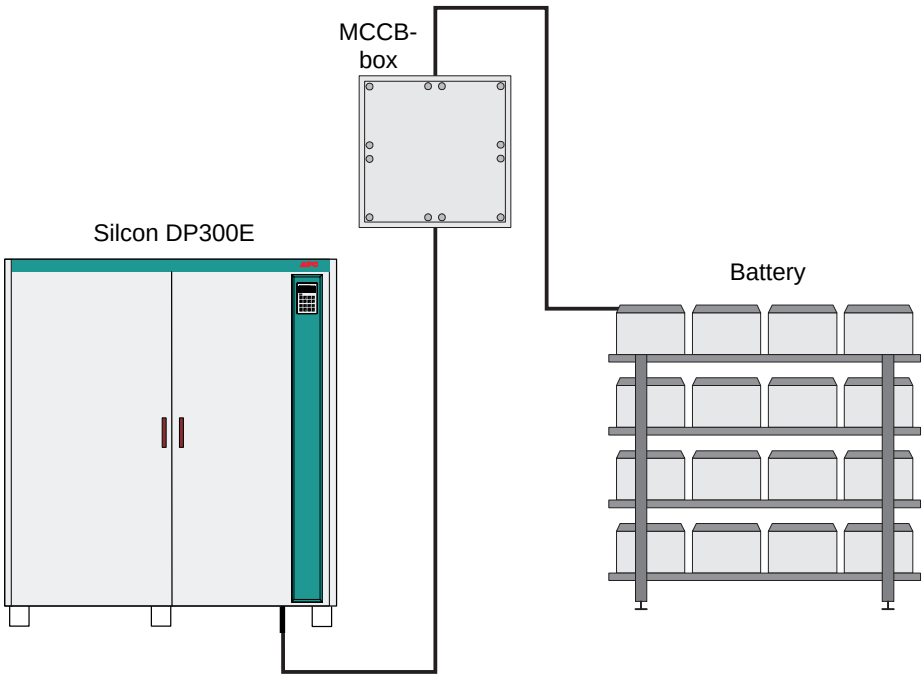
4.6.1.9 Diagram – Silcon DP300E with battery cubicle



4.7 MCCB-box for external batteries

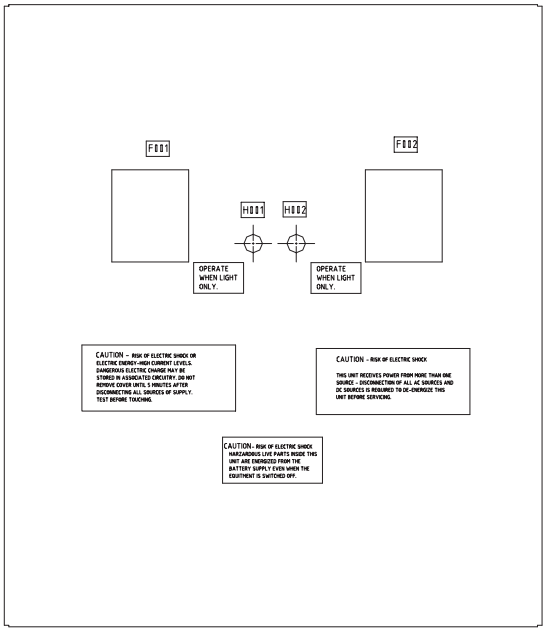
The MCCB-box is used for overcurrent and shortcircuit protection when the Silcon DP300E is installed with an external battery.

4.7.1 General arrangement

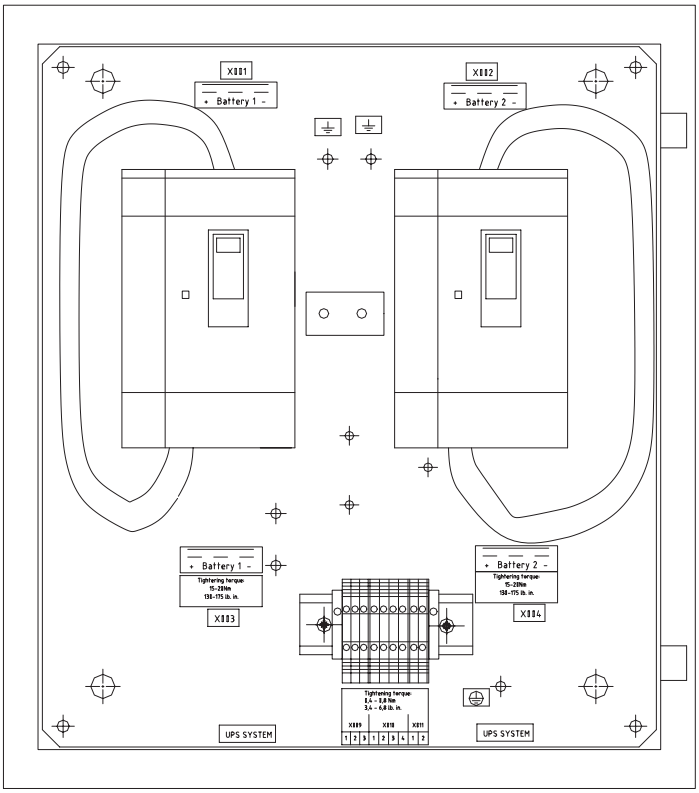


4.7.2 Front view (closed door)

Front view



Front view (Open door)



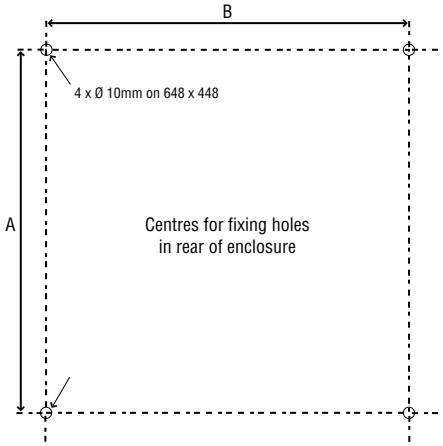
4.7.3 Mounting and Connection

NOTE:
All external cable dimensions are recommended.
Please refer to local national legal codes.

NOTE:
Ensure correct polarity at connection of DC cables.

NOTE:
Terminal for Equipment Grounding Conductor is marked ⏚

NOTE:
Grounding, please refer to local legal provisions.



External power conductors, overcurrent protection & mechanical sizes

Type	For System	Conduc–tors for equipment grounding	Battery MCCB [A] c)	DC conductors per battery pole a)	Dimensions HxWxD [mm³]	Fixing centres AxB [mm²]
MCCB–3120E–480	DP3120E - 480V	b)	200	2 x 1/0 AWG	750 x 550 x 175	648 x 448
MCCB–3160E–480	DP3160E - 480V	b)	250	2 x 3/0 AWG	750 x 550 x 175	648 x 448

Type	For System	Weight [kg/lbs]
MCCB–3120E–480	DP3120E - 480V	24/52.8
MCCB–3160E–480	DP3160E - 480V	24/52.8

a) Cable sizes refer to US National Electric Code.

All cables rated for 125% * nominal currents.

All DC cables rated 600V.

The tabled configurations are routed in conduits as follows:

DC: Battery 1:1 conduit with +, +, –, –, and equipment ground each.
Battery 2:1 conduit with +, +, –, –, and equipment ground each.

MCCB Power conductors and MCCB control wiring must be in separate conduits.

As regards recommended cable lugs and crimping tool, see section 4.1.6.

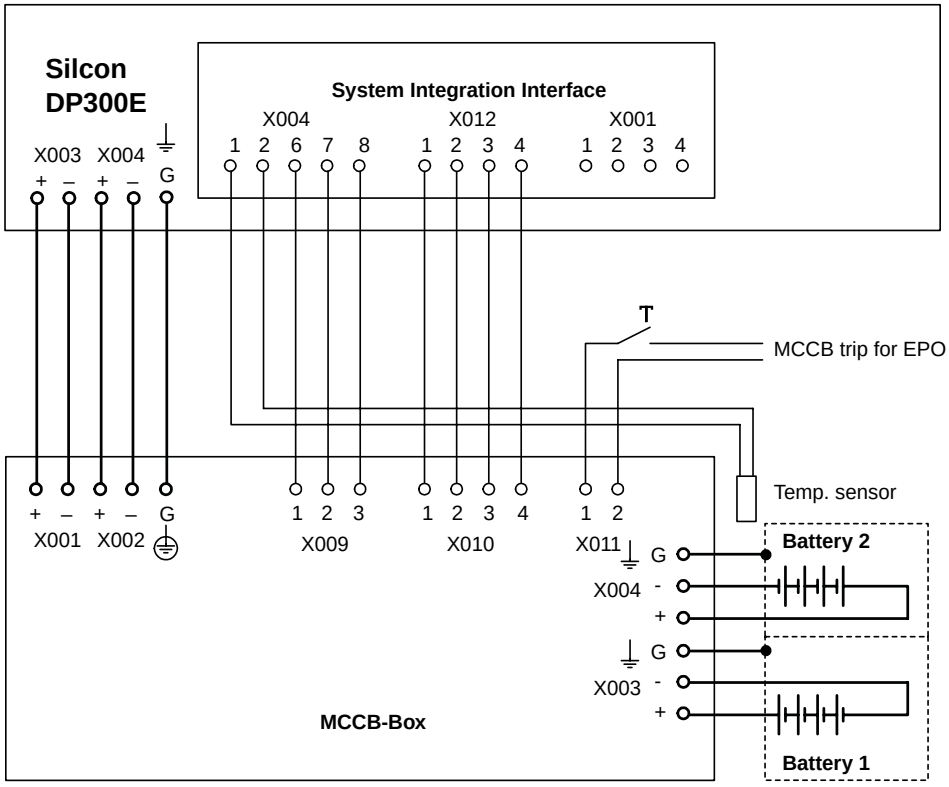
b) Routed in each of the power cable conduits for the connected equipment.
Cable sizes refer to NEC.
As regards recommended cable lugs and crimping tool, see section 4.1.6.

c) Alternate suppliers of battery cubicle must be Listed by Unterwriters Laboratory.
When APC battery cubicle is not used, the proper DC disconnects/overcurrent must be used in accordance with the APC Design Guide.

4.7.3.1 Mounting and Connection

DC-cables rated 600V on 480V systems from MCCB-box to UPS.

4.7.4 Silcon DP300E with external battery via MCCB-box



NOTE:
Only use the original control cable delivered with the parallel board.

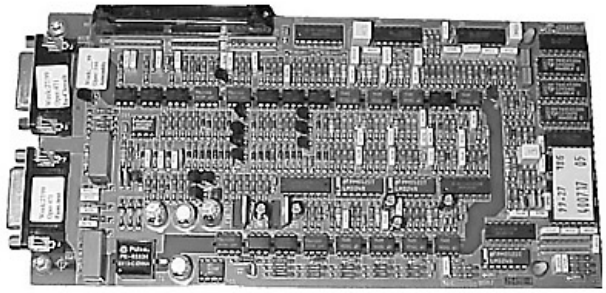
NOTE:
The control cables must be separated from the AC and DC power cables.

NOTE:
Common battery pack is a technical possibility.
However, APC recommend separate battery pack due to a higher safety degree in connection with redundant/parallel operation.
The UPS system is prepared for both solutions.

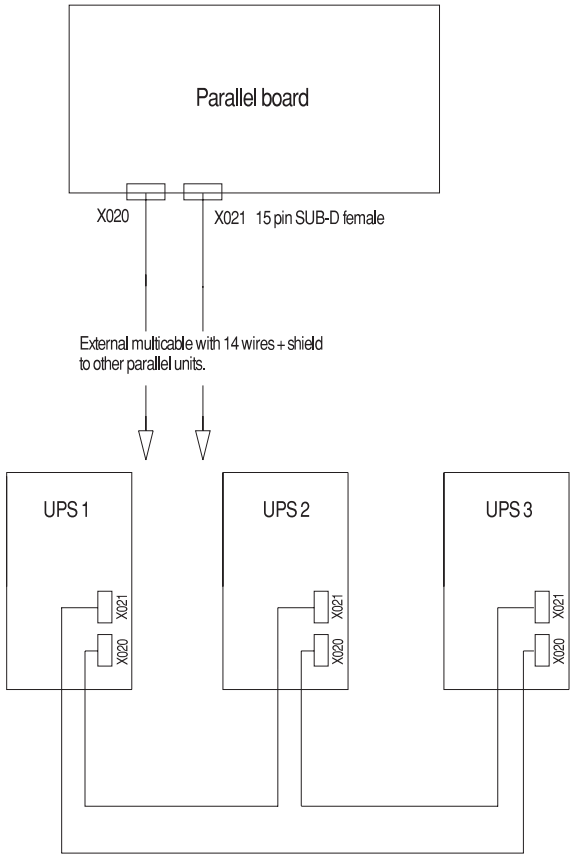
5.0 Options/Accessories

5.1 Parallel/Redundant operation

The parallel board.



Introduction.
The parallel board establishes the possibility to connect two or more systems in parallel - either to obtain increased security or to obtain higher total output power. Among other functions the parallel board ensures a correct load sharing between the parallel connected systems



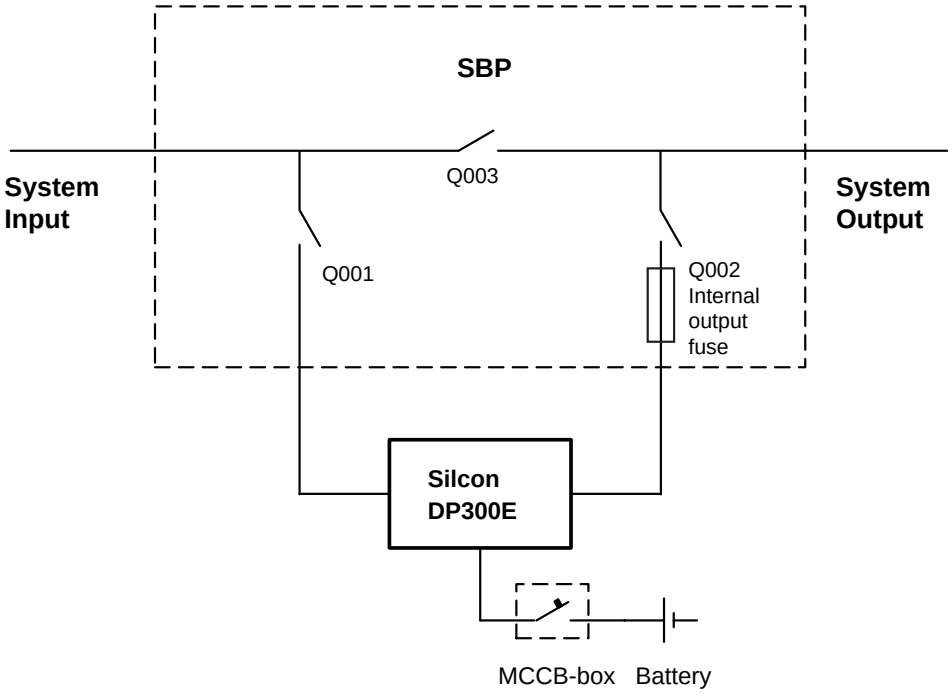
Options/Accessories

Control cables.
The external multicable is terminated with a 15 pin SUB-D plug in both ends. Pin 1 to pin 1, pin 2 to pin 2, and so on up to pin 15 - except pin 8, which is not connected. Shield is connected to plug cover in both ends.
The terminals X020 and X021 for the control cables are situated on the parallel board. X020 in UPS1 is connected to X021 in UPS2, X020 in UPS2 is connected to X021 in UPS3 and so on. X020 in last UPS is connected to X021 in UPS1.

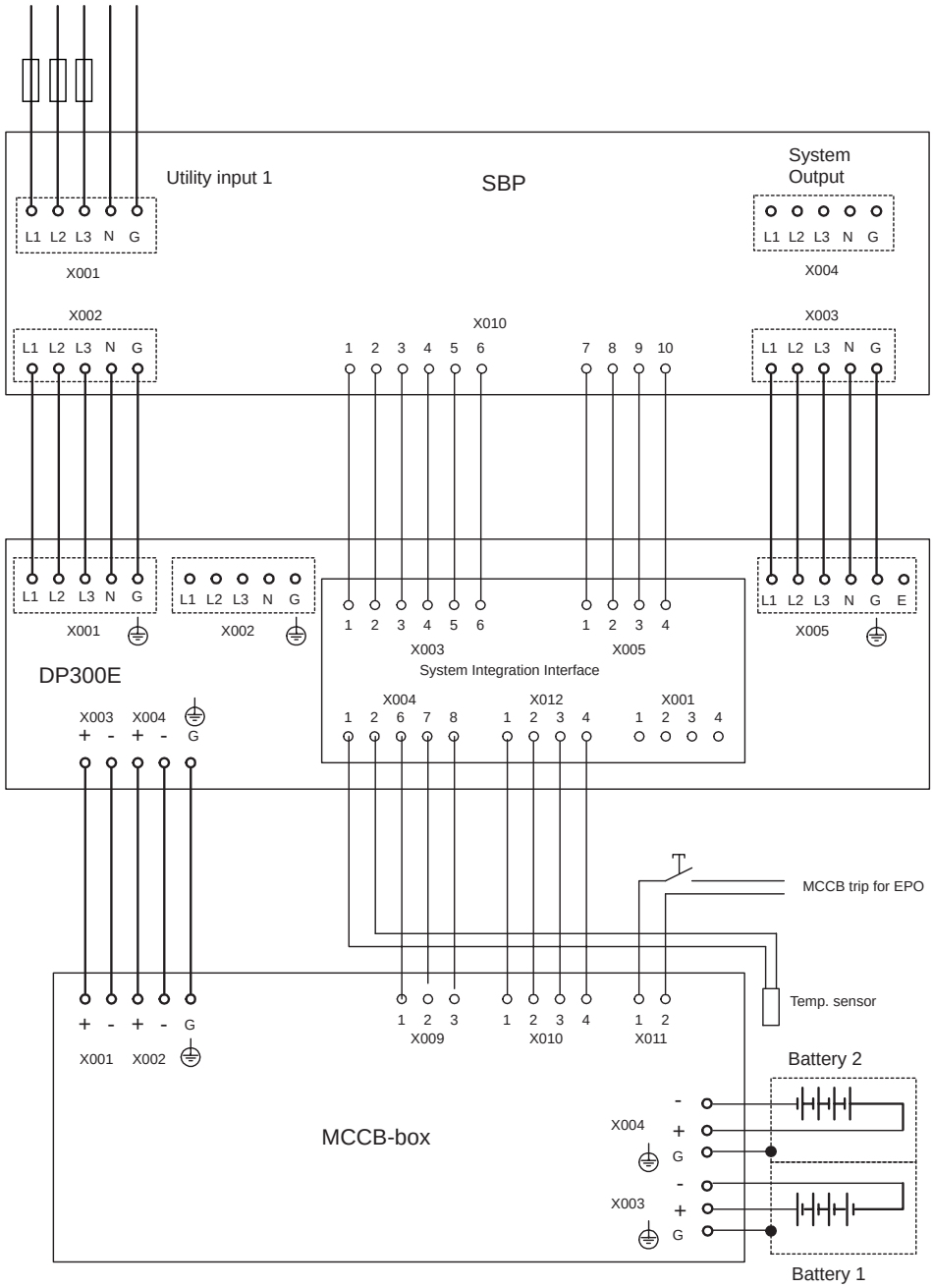
Power cables.
To optimize load sharing in parallel operation the external power circuits must be “symmetrical”, i.e. power input cables must have same lengths and cross-sections and the same for output cables.

5.2 Diagrams for Service Bypass Panel for Single Operation, Single and Dual Utility

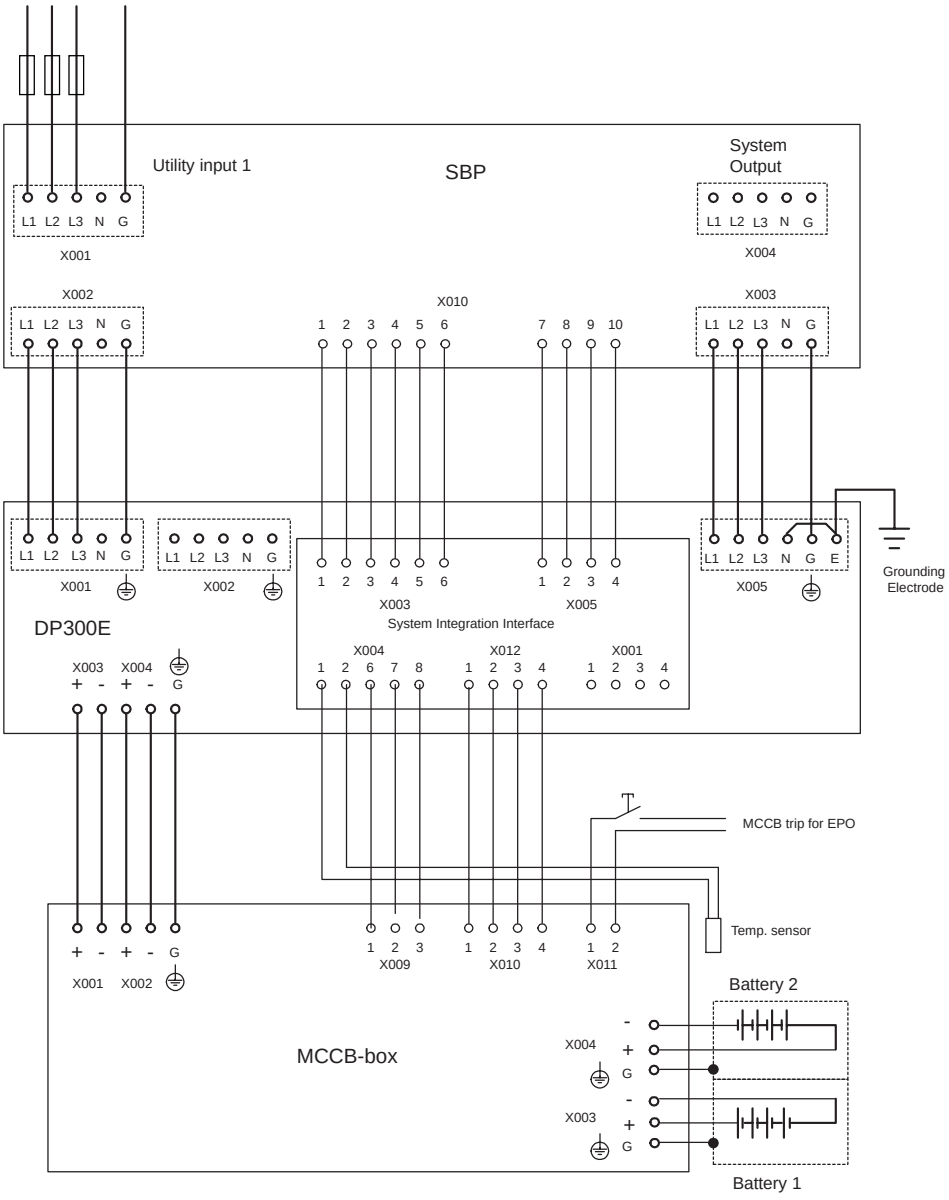
5.2.1 Diagram for Service Bypass Panel for Single Operation, Single Utility



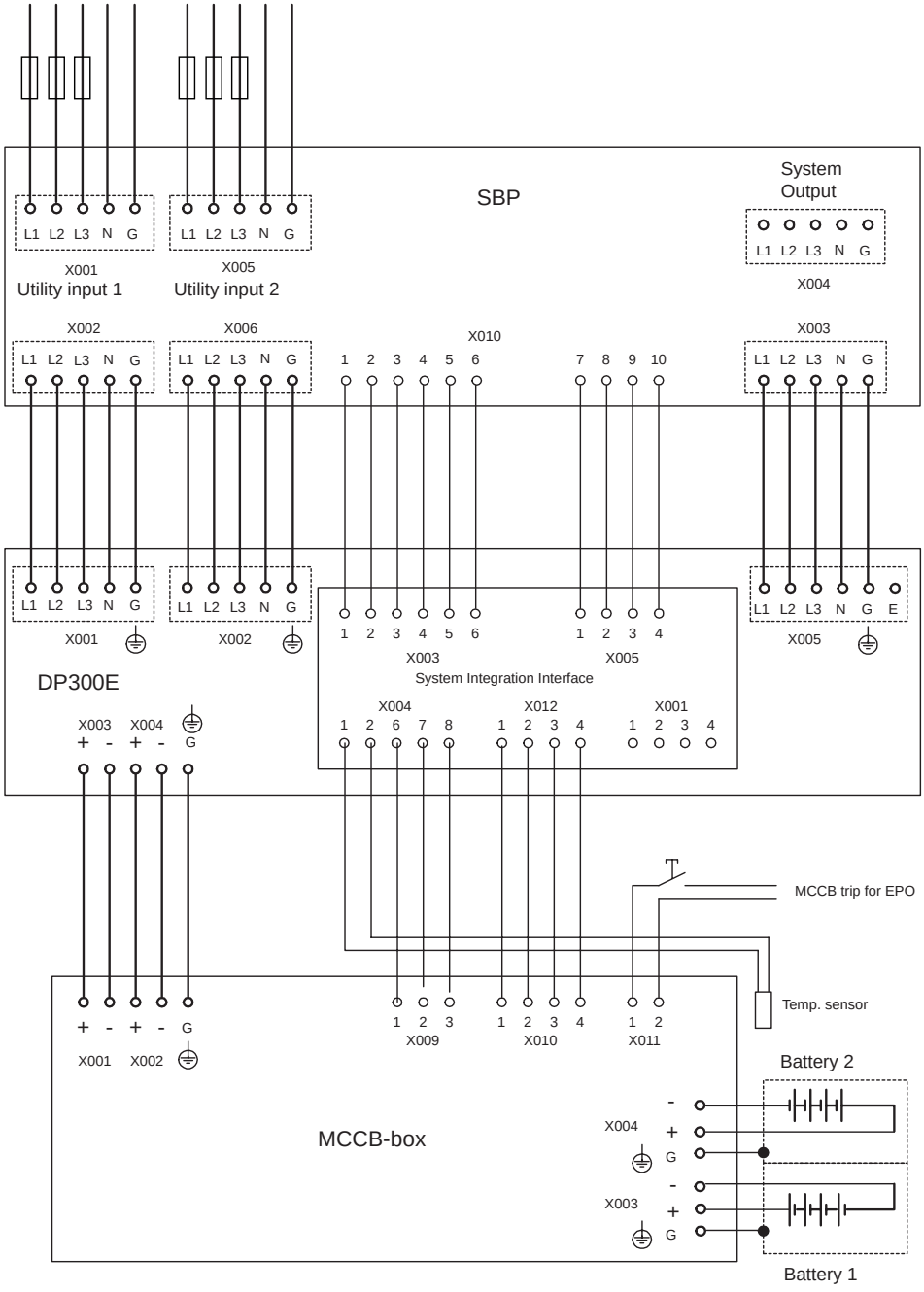
5.2.2 Silcon DP300E with SBP and External Battery via MCCB Box - Single Utility - 4 wire grounded WYE-service



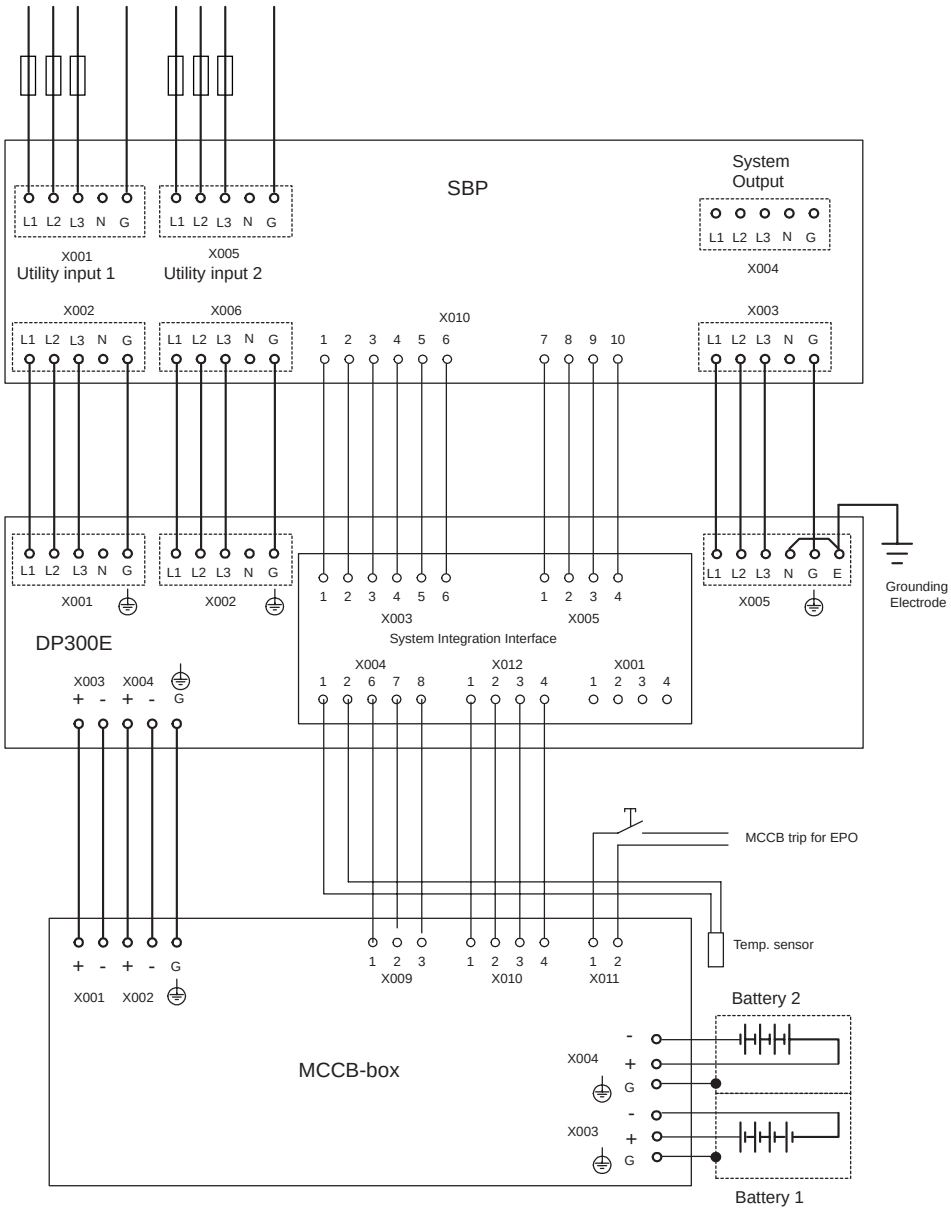
5.2.3 Silcon DP300E with SBP and External Battery via MCCB Box - Single Utility - 3 wire grounded WYE-service



5.2.4 Silcon DP300E with SBP and External Battery via MCCB Box - Dual Utility - 4 wire grounded WYE-service



5.2.5 Silcon DP300E with SBP and External Battery via MCCB Box - Dual Utility - 3 wire grounded WYE-service



5.2.6 Mounting & Connection

NOTE:
All external cable dimensions are recommended. Refer to local/national legal codes.

WARNING:
At 100% switch mode load the neutral conductor shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “Risk of electric shock”.

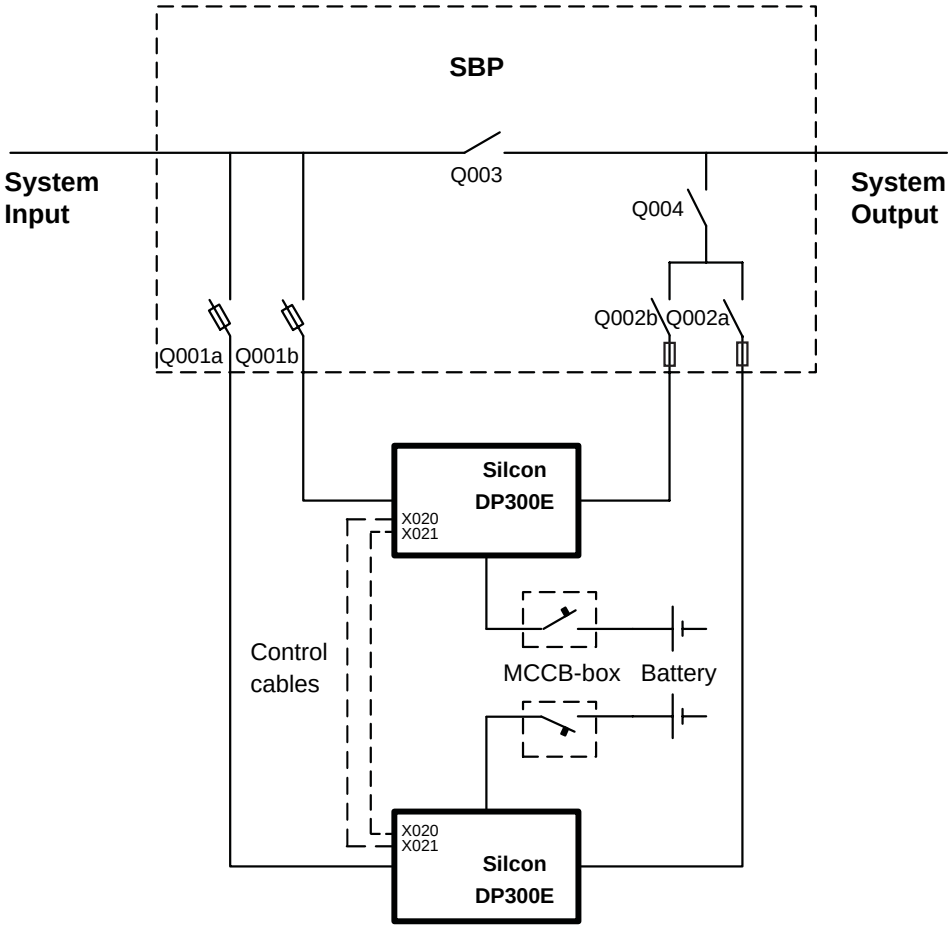
Terminal for Equipment Grounding Conductor is marked

NOTE:
Grounding, refer to local/national legal codes.

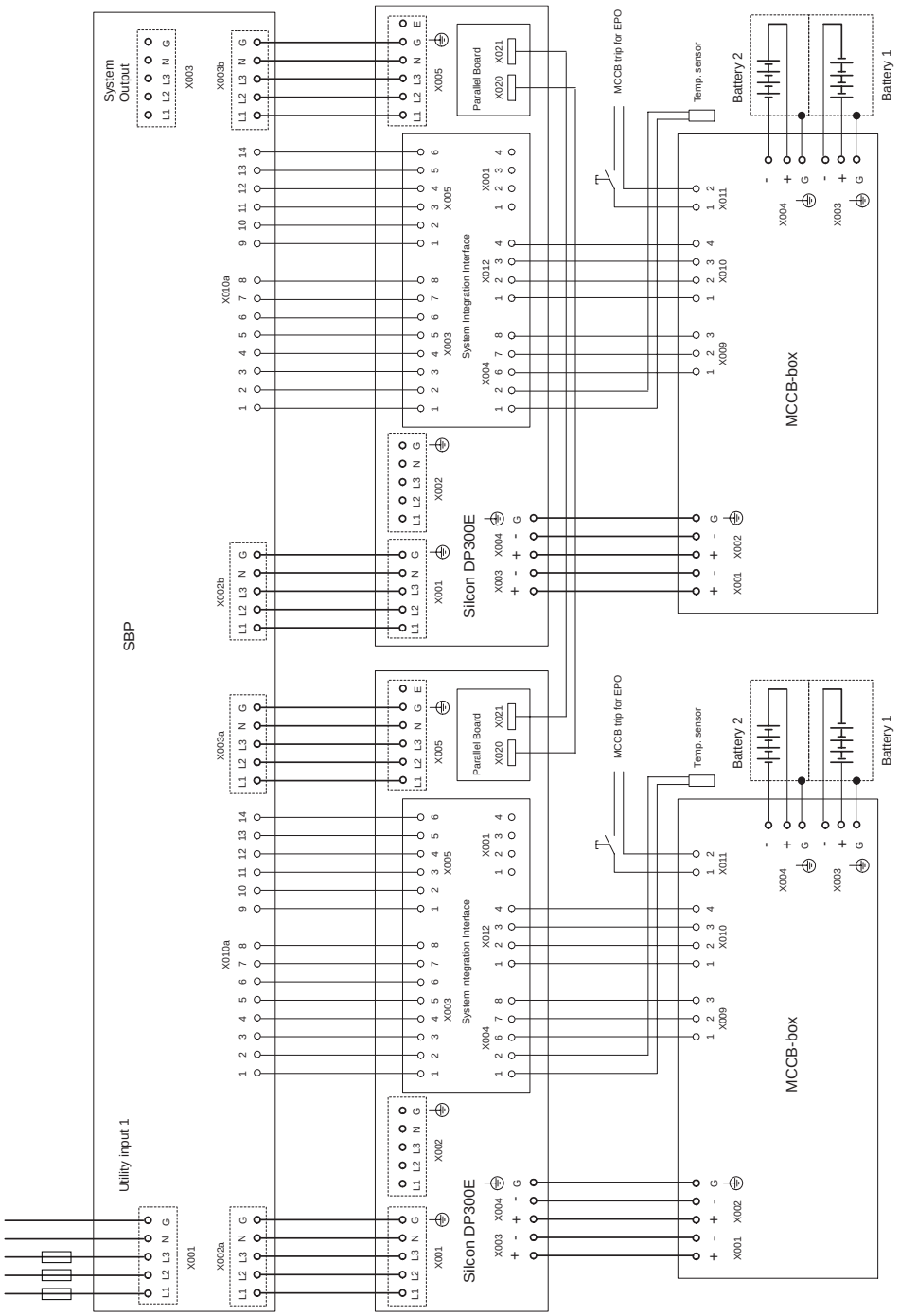
NOTE:
Ensure correct phase connection of inputs and outputs.

5.3 Diagrams for Service Bypass Panel for Parallel Redundant Operation, Single and Dual Utility

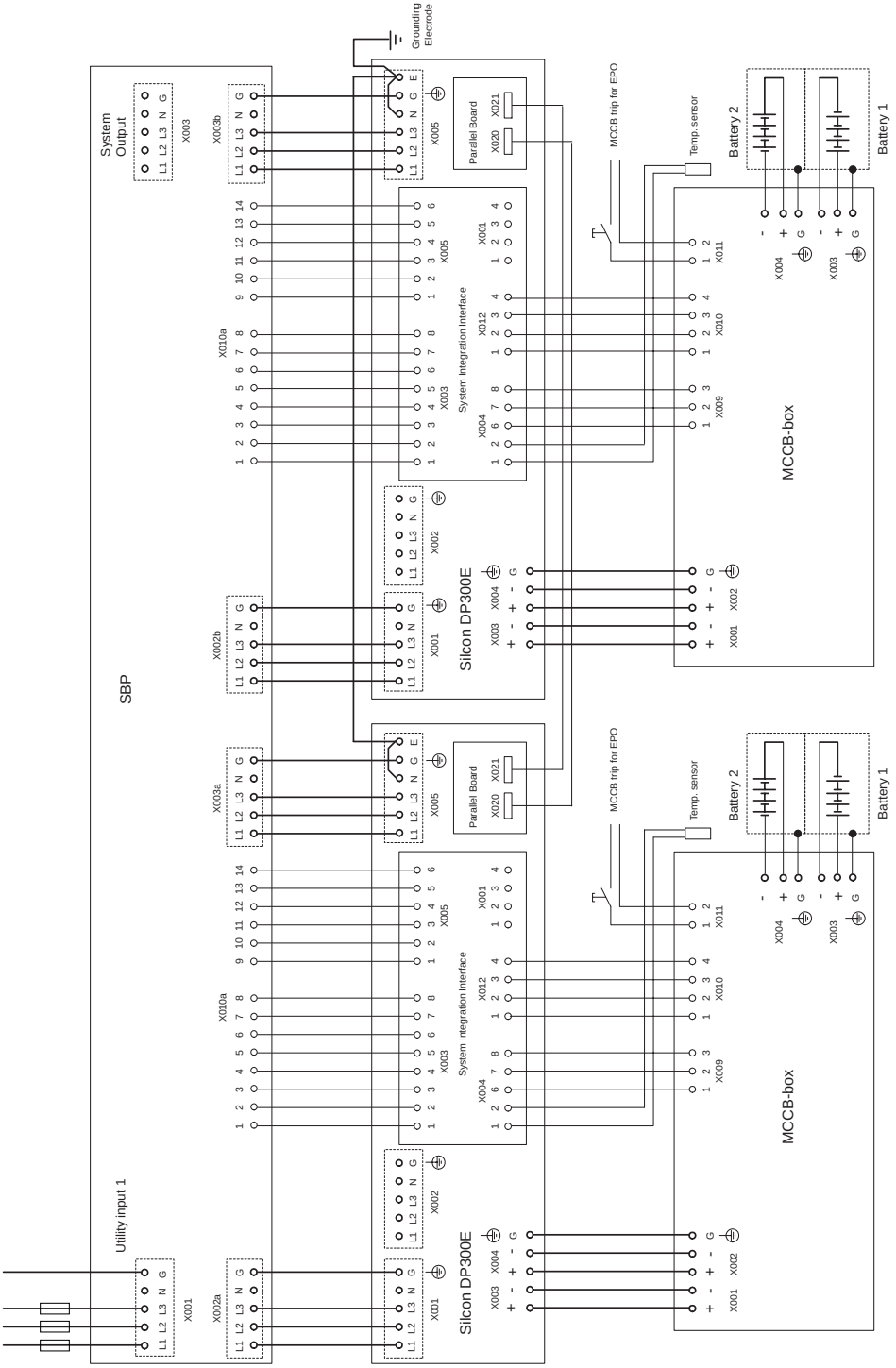
5.3.1 Principle Diagram for Service Bypass Panel for Parallel Redundant Operation Single Utility



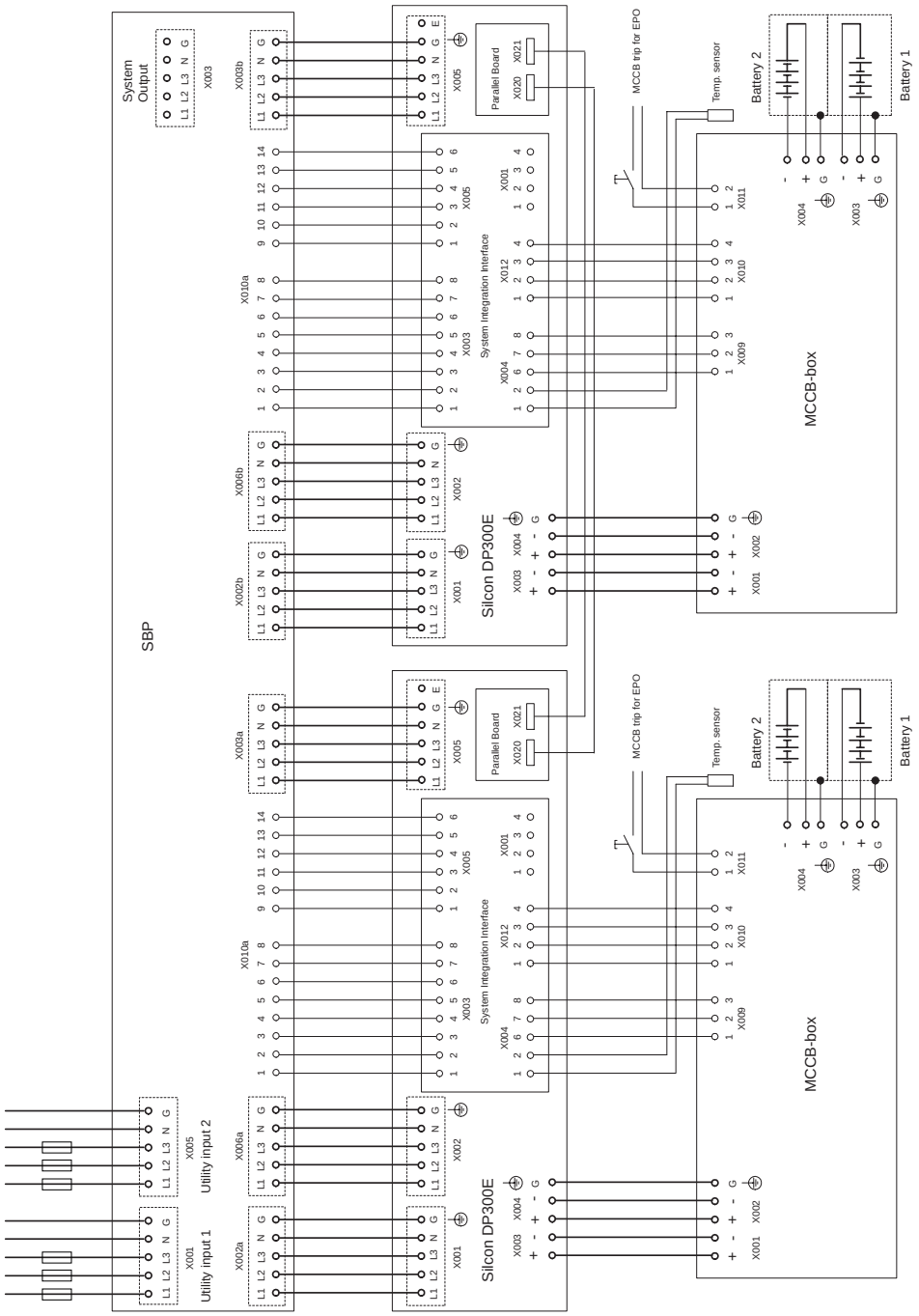
5.3.2 Parallel/Redundant Silcon DP300E with SBP and External Battery via MCCB Box - Single Utility - 4 wire grounded WYE service



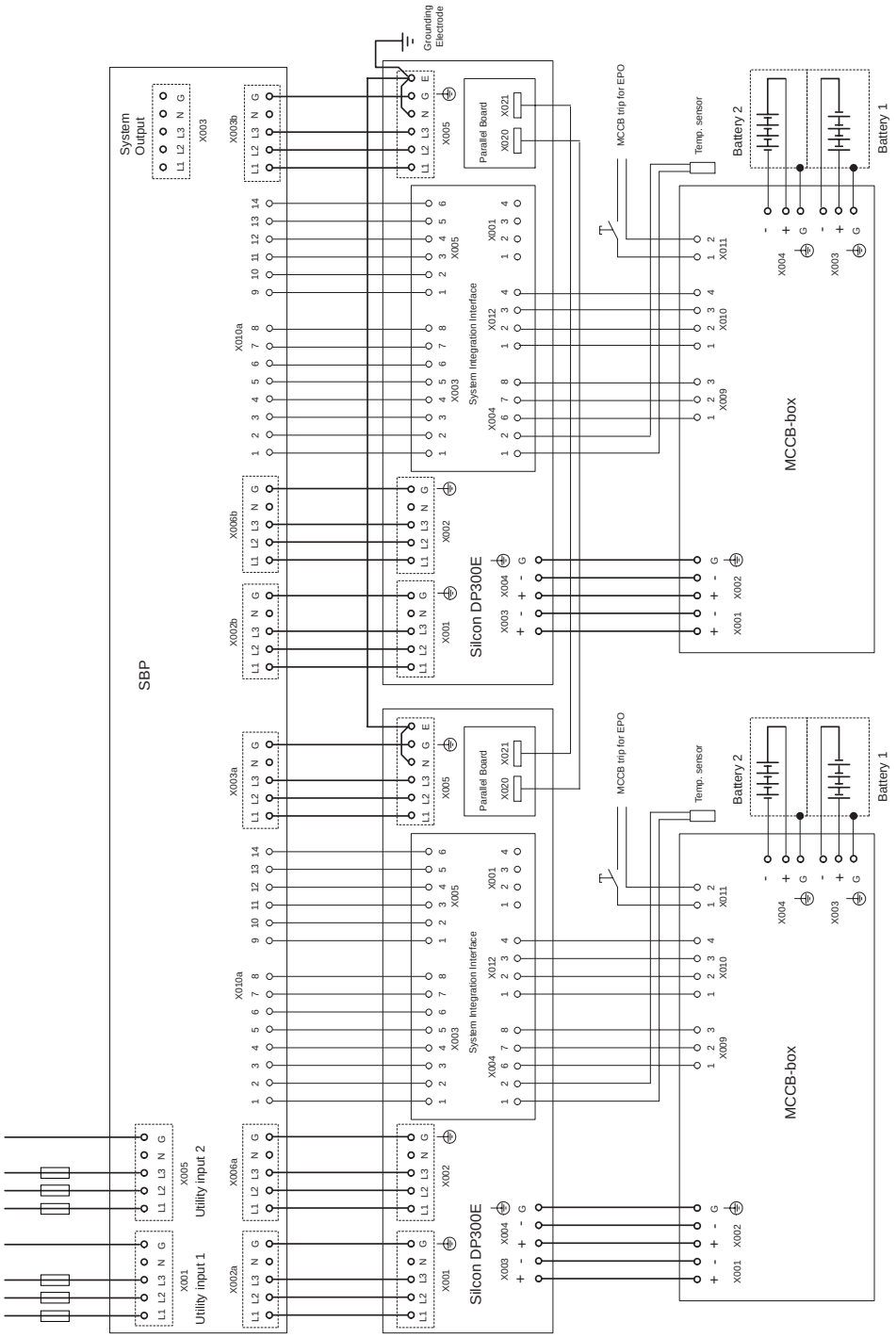
5.3.3 Parallel/Redundant Silcon DP300E with SBP and External Battery via MCCB Box - Single Utility - 3 wire grounded WYE service



5.3.4 Parallel/Redundant Silcon DP300E with SBP and External Battery via MCCB Box - Dual Utility - 4 wire grounded WYE service



5.3.5 Parallel/Redundant Silcon DP300E with SBP and External Battery via MCCB Box - Dual Utility - 3 wire grounded WYE service



5.3.6 Mounting and Connection

NOTE:
All external cable dimensions are recommended. Refer to local/national legal codes.

WARNING:
At 100% switch mode load the neutral conductor shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

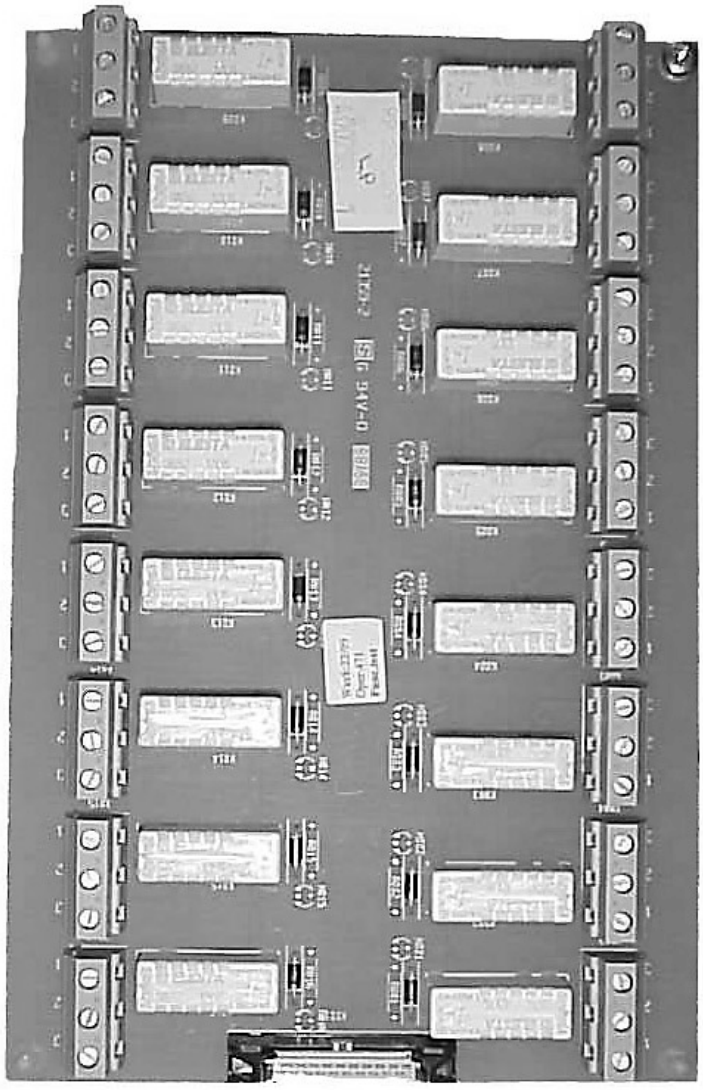
is symbol for “Risk of electric shock”.

Terminal for Equipment Grounding Conductor is marked

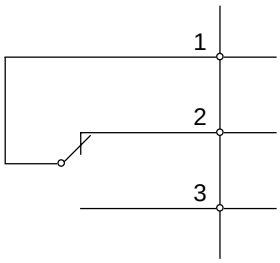
NOTE:
Grounding, refer to local/national legal codes.

NOTE:
Ensure correct phase connection of inputs and outputs.

5.4 Relay Board



Relays.
All relays are “fail safe”, i.e. relay coil is energized when there is no alarm.



The relay is shown in alarm position.

Max. load: 8.0A - 277V_{AC}
0.3A - 60V_{DC}

Min. load: 0.05A - 6V_{AC}
0.05A - 6V_{DC}

5.4.1 Relay Board, relay functions

NOTE:
If “Communication to controller lost” alarm is active, ALL relays will indicate failure.

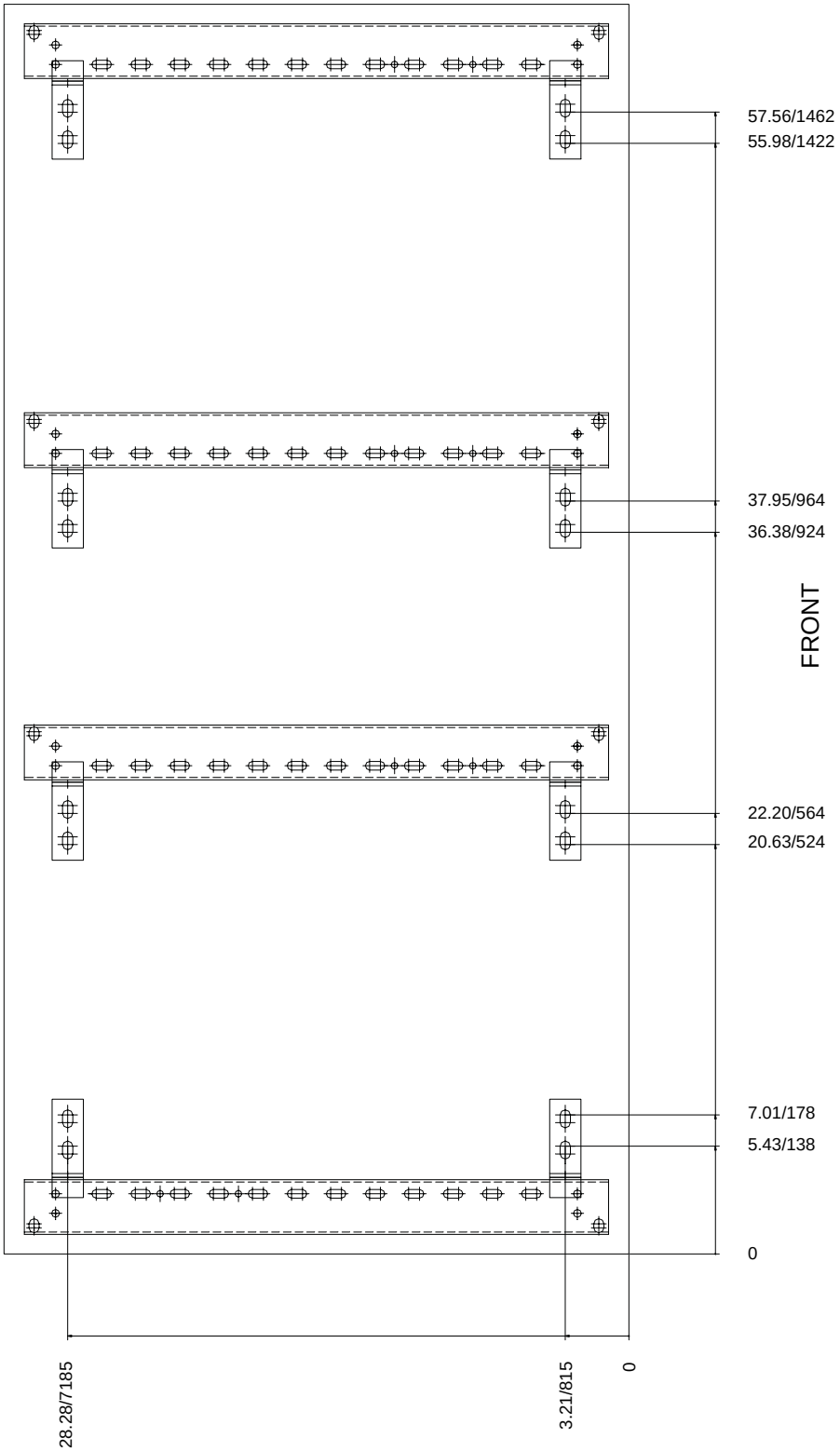
Relay No.	Name	Events that will trigger the alarm
1 ## (X002)	Utility Outside Limits	Utility voltage RMS value is outside limits Utility wave form (fast detector) is outside limits Utility frequency is outside limits
2 ## (X003)	Bypass Outside Limits	Bypass voltage RMS value is outside limits Bypass wave form (fast detector) is outside limits Bypass frequency is outside limits
3 ## (X004)	Output Outside Limits	Output voltage RMS value is outside limits Output wave form (fast detector) is outside limits Output frequency is outside limits
4 (X005)	System overload	Output load is over 100% Delta inverter current limiter is active Main inverter current limiter is active
5 (X006)	Fan fault	Blocked or faulty fan
6 (X007)	Equipment high temperature	Too high temperature on static switch Too high temperature on main inverter Too high temperature on delta inverter Too high temperature on magnetics Too high temp. on isolation transformer (option) Too high battery temperature
7 (X008)	Battery MCB OFF	Battery MCB is off
8 (X009)	Normal operation	UPS is running in normal operation (Status)
9 ## (X010)	Battery operation	UPS is running in battery operation (Status)
10 ## (X011)	Bypass operation	UPS is running in bypass operation (Status)
11 ## (X012)	Stand-by operation	UPS is in stand-by (Hot stand-by, parallel systems only)
12 (X013)	Service bypass operation	The service bypass switch is active
13 ## (X014)	Boost charge operation	UPS is boost charging on the battery
14 (X015)	Battery voltage outside limits	Too high DC voltage (shut down) DC voltage under warning level Too low DC voltage (shut down)
15 (X016)	Battery condition fault	The ABM has detected that the battery is week The ABM has detected that the battery is defective (ABM = Advanced Battery Monitor)
16 ## (X017)	Common fault	All alarms as mentioned above (Not relay 8+9+10+11) Internal power supply fault System locked in operation mode Fault in internal memory Fault in internal communication

Delay is programmable from the display under “Common fault delay”, see User Guide. Settings: 0, 10, 20, 30 seconds

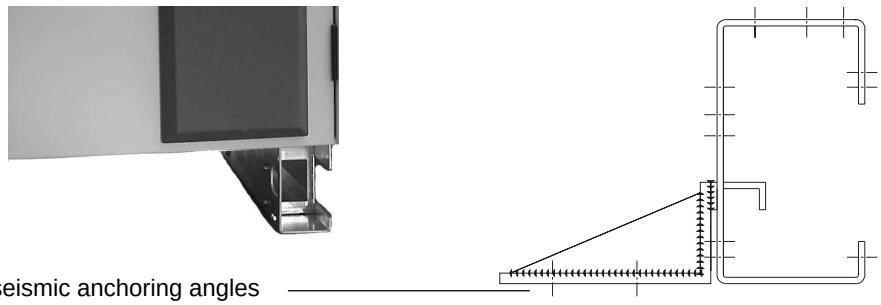
5.4.2 Relay Board, cable sizes

Cable sizes 24 AWG to 12 AWG are suitable. Use copper conductors only.
Cable size depends on current demand and ambient temperature.

5.5 Seismic anchoring



7OH0006 US rev. 03



8 seismic anchoring angles

IMPORTANT:
Remember to tighten all bolts in the 8 angles to the floor. Bolts for the floor are not enclosed.

5.5.1 Mounting seismic anchoring

16 holes for Ø10mm bolts have to be drilled according to dimensioned sketch, where the UPS system is to be placed.

The system is placed after drilling the holes, then 8 angles for seismic anchoring are to be fitted into the bars, see above. The angles are then tightened in the holes.

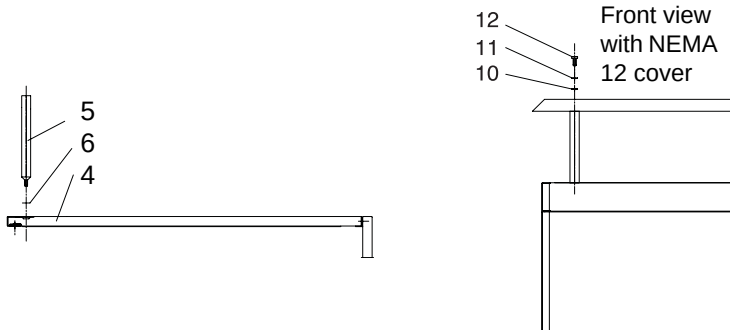
The angles for seismic anchoring are placed as shown above and bolted with bolts and plain washer.

5.6 NEMA 12 cover (IP31)

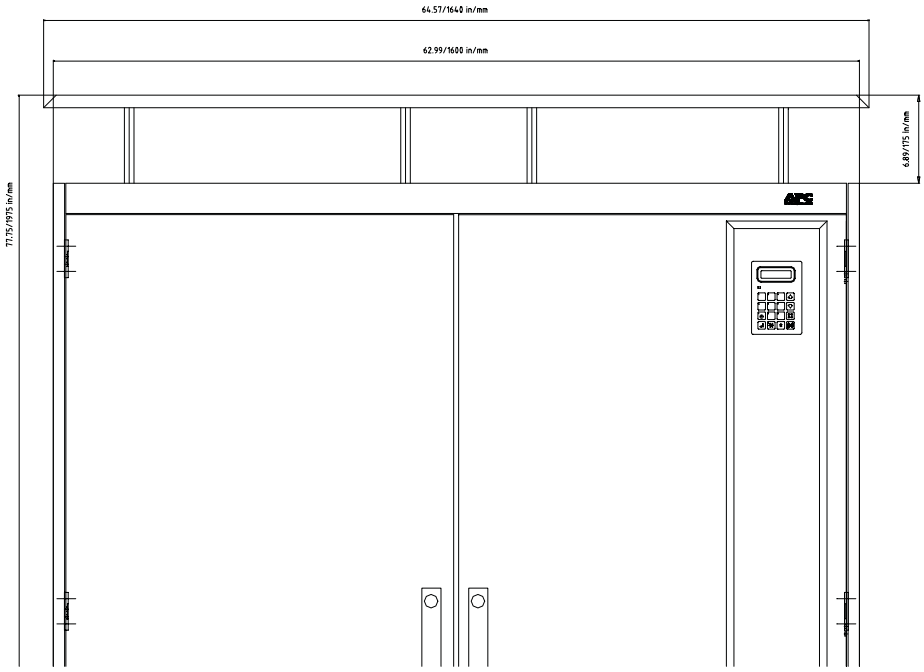
NOTE:
NEMA 12 is impossibel with top cabel entry.

5.6.1 Mounting NEMA 12 cover

- Replace all screws on the top cover (4) with distance stays (5) and plastic locking washer (6).
- Mount the NEMA 12 cover with plain washer (10), spring washer (11) and screw (12) on the 4 distance stays.



5.6.1.1 Front view with NEMA 12 cover



5.7 Remote display

5.7.1 Introduction

The remote display unit provides the Silcon DP300E series with the possibility to display condition data at remote sites of up to 25 meters away from the Silcon DP300E unit. For extension of communication distance, see section 5.7.1.1 below.

The remote display can easily be connected to the Silcon DP300E series via the serial communication ports on the communication interface.

To obtain a transmission distance of 3.2 km the normal RS232C signal levels of the serial in/out port must be converted to a 20mA current loop. The RS232C/20mA converter must be placed outside the Silcon DP300E cubicle.

5.7.1.1 Extension of communication distance for remote display

The remote display communicates with the UPS through a 3 wire RS232 interface. The remote display is a DTE (Data Terminal Equipment) employing a SUB-D 9 pole female connector. The communication speed is 9,600 bps.

The communication distance is rather limited, see Table I. If a longer distance is necessary or if the communication cable goes through magnetic noisy areas, it is necessary to insert converters. Table 1 gives examples of three ways of increasing the communication distance. All converters must be locally purchased.

Table 1: Examples of communication extension to remote display.

	Standard (RS232)	RS485	Current Loop	Optic fibre
Max. distance	25 meters	1,200 meters	3,200 meters	2,000 meters
Converter Manufacture Art. code	No converter	BLACK BOX IC 109A-E	BLACK BOX ME 800A-E	BLACK BOX ME540AE-ST
RS232 connector on black box		Sub-D 25 pole female	Sub-D 25 pole female	Sub-D 9 pole female
Interconnector of black boxes		4-screw terminal	4-screw terminal	ST fibre terminal

Connections - without converter:
A 3 wire shield cable with a 25 pole female Sub-D and a 9 pole male Sub-D must be made. Connect the cables as shown in Table 2. Do only connect the shield in one end.

Table 2: Pin connection for interconnection without converter.

25 pole female	9 pole male
Pin no.	Pin no.
2 (TXD)	2 (RXD)
3 (RXD)	3 (TXD)
7 (GND)	5 (GND)
House	No connection

Connections - with converter:
When buying a converter solution, the enclosed manual will explain how the connections must be made. Please follow this manual carefully.

As an example, the connection of the Black box: ME 800A-E (current loop) will be described in the following by Table 3.

Table 3: Pin connections from host to ME 800A-E and from ME 800A-E to Remote display

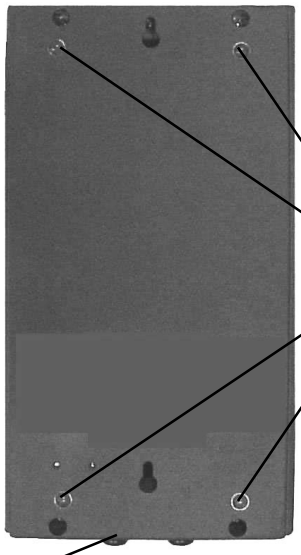
Host (DTE)	ME 800A-E (DCT)	Inter-connection	ME 800A-E (DCT)	Remote display (DTE)
Pin no.	Pin no.		Pin. no.	Pin no.
2 (TXD)	2		3	2 (RXD)
3 (RXD)	3		2	3 (TXD)
7 (GND)	7		7	5 (GND)
House (Shield)	No connection		No connection	House (Shield)

The ME 800A-E must be set up as a DCT with no RTS/DTR control.
The interconnection cable is a 4 wire twisted pair telephone cable with or without shield. The shield improves noise immunity but reduces the maximum communication distance.

5.7.2 Installation of remote display

5.7.2.1 Connecting RS232C and utility adapter

Back view



1. Loosen the 4 screws by turning 180°

2. Remove front cover

Cabel entry from bottom and back

NOTE:
All alarm and signal circuit field wiring shall be rated 300V minimum.

Back view

3. Mount the backplate

Front view

DP9P

Utility adapter

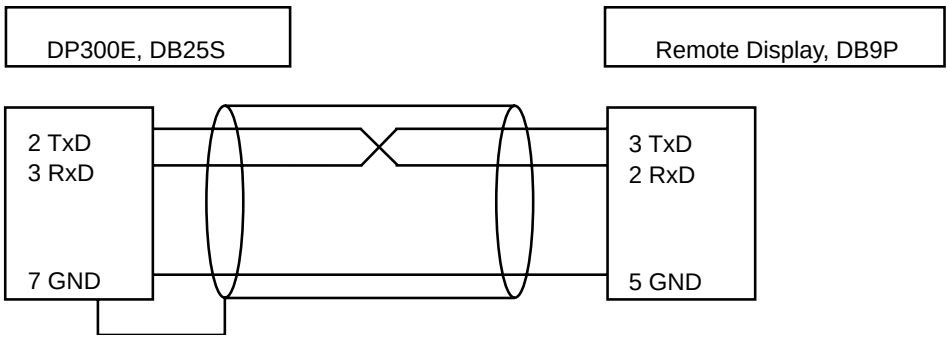
4. Connect cables

5.7.2.2 Remote display power supply

The remote display power supply is a normal AC power supply with no battery back-up. This means that if data transmission with the Silcon DP300E has to continue during break down of the commercial utility, the remote display has to be supplied from the Silcon DP300E or another uninterruptible power source.

5.7.2.3 Cables for remote display

RS232C to RS232C cable:



Connect shield at one end only!
Rating: Please refer to Local/National electrical codes for more information,communication voltage $\pm 15V_{DC}$

5.8 Isolation Transformer Module

WARNING:
For dual utility the same type of isolation transformers always has to be used for the 2 utility input.

Introduction.
The isolation transformer module is used in following mentioned configurations:

1. Between utility supply and UPS input, when a 3-phase Delta-service, phase or midpoint of 2 phases grounded, is available.
2. Between utility supply and UPS input, when galvanic isolation is required.
3. Between UPS output and load, when galvanic isolation is required.
4. Between UPS output and load, when step down from 480V to 208V/Y120V is required.

The isolation transformer may not be bypassed by any kind of switchgear. Even if the turn ratio is unity, heavy and damaging circulation currents can occur, when the transformer is bypassed.

NOTE:
Ensure correct phase connection of inputs and outputs.

Coupling methods:
The isolation transformer is configured as Delta-WYE with accessibel neutral (Dyn11).

WARNING:
At 100% switch mode load, the neutral shall be rated for 173% output phase current.

Recommended use:
- For 3 wires in/out.
- For 3 wires in / 4 wires out.
- For 4 wires in/out.

NOTE:
All external cable dimensions are recommended.
Refer to local/national legal codes.

5.8.1 Requirement on the installation site
The isolation transformer is designed with all parts accessible from front or top, and cable entries from bottom. The isolation transformer can be placed close to walls, only free space for front door opening has to be ensured. Sufficient cooling has to be ensured by a free space for ventilation slots. Avoid placing the isolation transformer in direct sunlight. *See also Installation Guide from transformer supplier.*

NOTE:
Grounding, refer to local/national legal codes.

5.8.2 Cubicles and dimensions
See the installation guide for Isolation Transformer.

NOTE:

is symbol for “risk of electric shock”.

Terminal for Equipment Grounding Conductor is marked

Terminal for Grounding Electrode Conductor is marked “E”.

5.8.3 Foot prints
See the installation guide for Isolation Transformer.

NOTE:
The terminals marked

and

are electrically connected to the terminal marked “E”.

5.8.4 Connecting the isolation transformer
See the installation guide for Isolation Transformer.

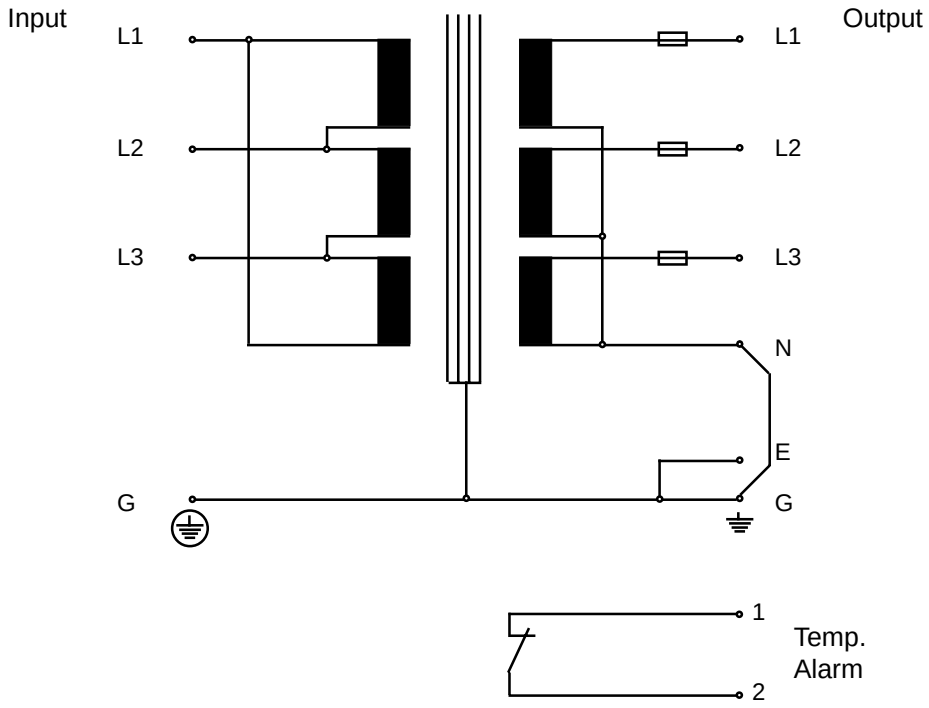
5.8.4.1 External temperature alarm cable

Voltage rating must be 600V. Cable size can be 18 to 14 AWG.

5.8.5 Recommended cable lugs and crimping tool types

See section 4.1.6.

5.8.6 Isolation transformer - Diagram Delta-WYE configuration (Dyn11)



5.8.7 Grounding the isolation transformer

5.8.7.1 System grounding

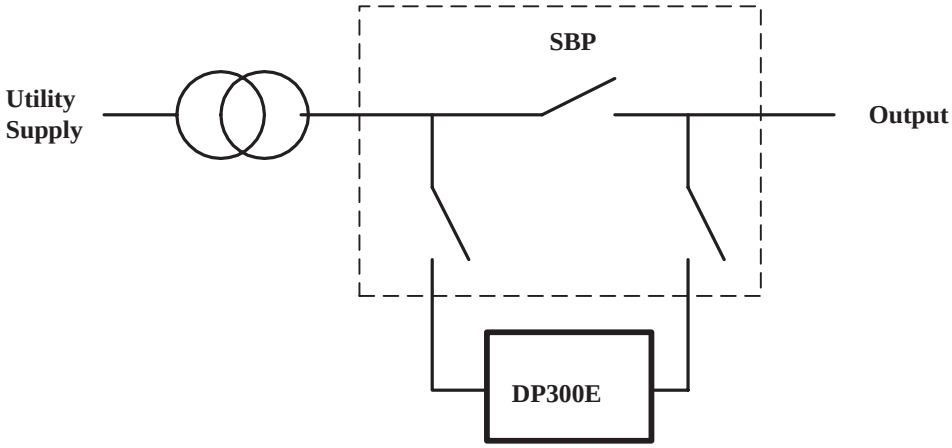
See the installation guide for Isolation Transformer.

5.8.7.2 Equipment grounding

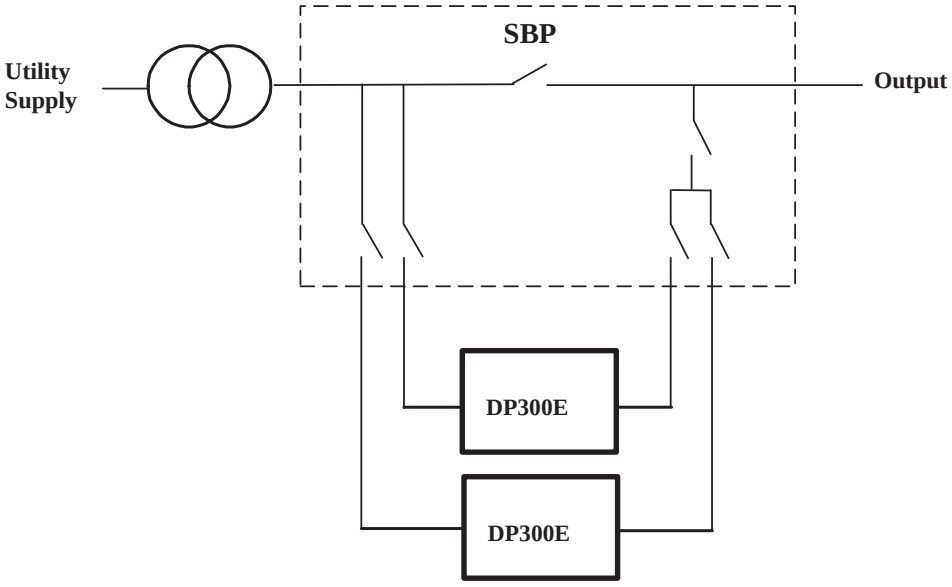
Terminal marked ⏚ is intended for equipment grounding.

5.8.8 Principal diagram

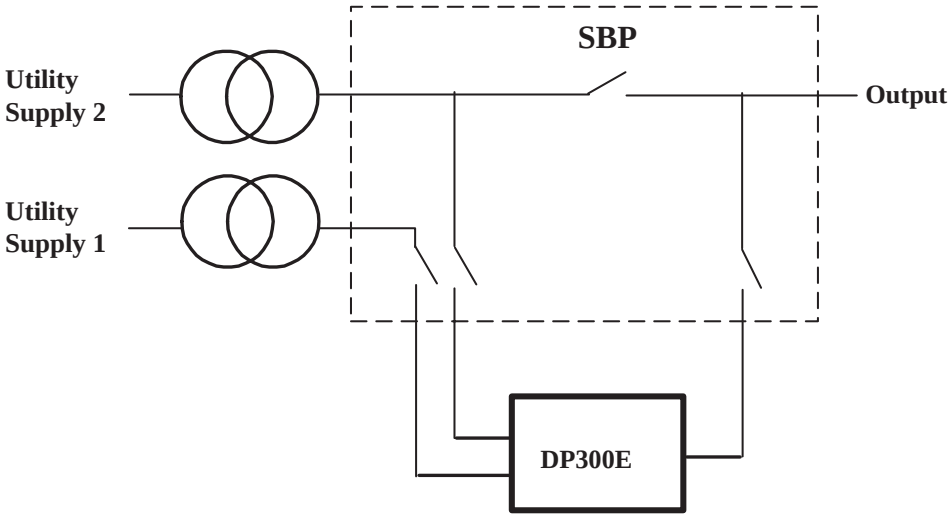
5.8.8.1 Single utility and single system



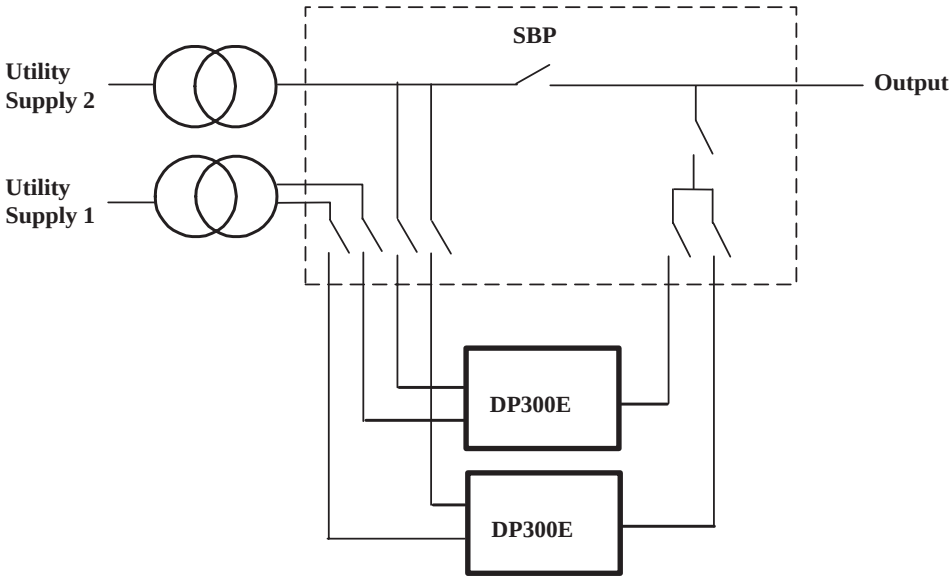
5.8.8.2 Single utility and redundant system



5.8.8.3 Dual utility and single system



5.8.8.4 Dual utility and redundant system



6.0 System specifications

6.1 Technical data

Input	Voltage	3 x 480V
	Voltage tolerance Normal operation Bypass operation	 ±15% ±10% (standard) ±4, 6, 8% (programmable)
	Frequency	60Hz ±6% standard ±0,5-8% (programmable)
	Input PF	Load 25% min. 0,97 Load 100% min. 0,99
	Current distortion	Max. 5%
Output	Voltage	3 x 480V
	Voltage tolerance	±1% static, sym. load ±3% static, asym. load ±5% 0-100% load step
	Voltage distortion	Max. 3%, linear load Max. 5%, non-linear load (Silcon DP3120E-DP3160E)
	Load power factor	0,9 lead to 0,8 lag
	Frequency	60Hz (utility synchronized) ±0,1% free running
	Overload capacity Normal operation Normal operation Battery operation Bypass operation	 200% - 60 secs. 125% - 10 min. 150% - 30 secs. 125% - cont.
General	Ambient temperature	0-40°C/32-104°F (Above 25°C/77°F the battery life time is reduced)
	Humidity Protection class Safety Emission and Immunity Static bypass switch Auto restart Economy mode	Max. 95%, non condensing NEMA 1 EN50091-1 UL 1778 EN50091-2 Built-in Programmable Programmable

7.0 How to contact APC

www.apcc.com

For more information call:
Tel: (800) 800-4APC - US & Canada
Tel: (401) 789-0204 - Worldwide

APC Corporate
132 Fairgrounds Road
West Kingston, RI 02892
USA
Tel: (401)789-0204
Fax: (401)789-3710
Internet: apcinfo@apcc.com
PowerFax™: (800) 347 - FAXX
APC Web site: www.apcc.com

APC Denmark A/S
Silcon Allé
DK-6000 Kolding
Tel: (+45) 75 54 22 55
Fax: (+45) 75 54 27 89

Product Support
E-mail: silcontech@apcc.com

Pre-sales Technical Support
1-877-474-5266 (1-877-4Silcon)

Post-sales Technical Support
1-877-287-7835 (1-877-2UPS-TEK)

Fax: 1-401-438-7761
Web: www.apcc.com/support/contact/contact_support.cfm